# RESOURCE MANAGEMENT PLAN

# KALAUPAPA NATIONAL HISTORICAL PARK

KALAUPAPA, HAWAI`I

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Recommended:

Natural Resources Program Manager, KALA Date

Approved:

Superintendent, Kalaupapa National Historic Site Date

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# INTRODUCTION

## Purpose of the Resource Management Plan

This Resource Management Plan describes the cultural and natural resources of Kalaupapa National Historical Park and the issues affecting them. Management actions to address these issues and fulfill the park's purposes are developed in the management program and detailed in the project statements. The Resource Management Plan intends to inform Regional and Service administrators of the park's resources management plans and funding requirements, to provide park resource managers with a working guideline, and to inform the Kalaupapa community and the general public of the goals of the park's resource management program.

## Purposes of the Park

The Act authorizing Kalaupapa National Historical Park (Public Law 96-565 enacted December 22, 1980) set forth the following as the principal purposes of the park:

(1) to preserve and interpret the Kalaupapa settlement for the education and inspiration of present and future generations;

(2) to provide a well-maintained community in which the Kalaupapa Hansen's Disease patients are guaranteed that they may remain at Kalaupapa as long as they wish; to protect the current lifestyle of these patients and their individual privacy; to research, preserve, and maintain the present character of the community; to research, preserve, and maintain important historic structures, traditional Hawaiian sites, cultural values, and natural features; and to provide for limited visitation by the general public; and

(3) to provide that the preservation and interpretation of the settlement be managed and performed by patients and native Hawaiians to the extent practical, and that training opportunities be provided such persons in management and interpretation of the settlement's cultural, historical, educational, and scenic resources.

Based on the above, the long-range purpose of Kalaupapa National Historical Park is to preserve the natural and cultural setting of the Kalaupapa peninsula to tell the story of its people's courage, faith, and perseverance despite affliction with a misunderstood and wrongly feared disease, which forced them to leave family and friends. As an internationally known park, Kalaupapa will publicize that ordinary medical out-patient treatment and NOT isolation must be the medical and human standard to deal with Hansen's Disease worldwide.

Created as a National Historical Park and as a unit within the National Park Service, park managers have a responsibility to protect and preserve both the cultural and natural resources of the area. During the 1960s, the Secretary of the Interior described three different management schemes for national, historical and recreational parks. Originally, this meant lesser protection of natural

resources in historical and recreational units. However, the 1970 Act for Administration of the National Park Service (16 U.S.C. 1a01 and 1c(b)) changed the earlier management schemes allowing for every unit within the National Park Service to focus equally on both cultural and natural resources protection (Buono, 1989).

The general statutes that guide National Park Service land management are applicable at Kalaupapa National Historical Park. Among the most important of these are the National Park Service Organic Act (16 U.S.C. sec 1 et seq.), the Act for Administration (16 U.S.C. 1a-1), the Endangered Species Act, and the Historic Preservation Act. In the National Park Service Organic Act, Congress set forth the purpose of the National Park System, which is

> to conserve the scenery and the natural and historic objects and wildlife therein and to provide for the enjoyment of the same in such manner and such means as will leave them unimpaired for the enjoyment of future generations...(16 U.S.C. sec 1).

Kalaupapa National Historical Park is responsible for fulfilling these laws in addition to the specific purposes outlined by Congress when creating the park.

## Description of Area

Kalaupapa National Historical Park is located midway along the north coast of the island of Moloka`i. The island is approximately in the center of the eight major islands in the Hawaiian chain. Moloka`i ranks fifth in size, contains about 259 square miles of land, and is roughly 38 miles long and six to ten miles wide. The park includes the relatively flat peninsula on the north shore of the island and also three deeply carved valleys, the steep slopes rising more than 3,000 feet to and including the rim of the cliffs. The park boundaries extend one-quarter mile offshore and encompass the islands of Huelo and `Okala. Land access is via a steep trail which is about two miles long with 26 switchbacks. There are no roads to Kalaupapa. Air taxi service by commuter class aircraft provides the main access to Kalaupapa. Planes arrive and depart two to four times a day, weather permitting. Mail, freight, and perishable food, arrive by cargo plane on a daily basis. Barges bring cargo to Kalaupapa twice a year, during the summer months of July and September, when the sea is relatively calm.

**Climate:** Median annual rainfall for the peninsula ranges from less than 25 inches up to 75 inches. Great variation over a small area is the result of being located windward of and close to the high cliffs. The trade winds average about 10 to 15 m.p.h. and affect the weather systems. Heavy rainfall is found at the higher elevations and, at Pu`u Ali`i Natural Area Reserve, supports a luxuriant rain forest.

**Geology:** The north shore cliffs were formed, geologists hypothesize, during a time of severe earth movements. The earth movements caused the land to shear off and sink to the ocean floor leaving the 3,000 ft. (914 meters) cliffs behind. Later, through a weak spot in the earth's crust, magma found its way to the surface. This magma formed the small volcano, Pu`u `Uao (elevation: 123 meters),

which gave birth to the peninsula and formed the Kalaupapa shield. The shield is the most recent evidence of volcanism on Moloka`i, presumably occurring in the late Pleistocene. Its pahoehoe basalt contains unusually large crystals of olivine, feldspar and augite. Today, Kauhako Crater indents the center of the shield and contains a lake 248 meters deep. Parts of the crater rim display a pahoehoe structure characteristic of numerous overflows from a lava lake that veneered the summit with thin layers of highly fluid, gaseous lava.

**Topography:** The peninsula is relatively flat when compared to the cliffs, although there are 25 percent slopes near Kauhako Crater. More than half the park, however, is comprised of three narrow valleys, deeply eroded into the main shield volcano of the island. All three, Waikolu, Wai`ale`ia, and Waihanau, are bordered on three sides by 1,600 to 3,000 feet vertical cliffs. Waikolu Valley, the largest of the three, is typical of the series of windward valleys that extend east from Kalaupapa to Halawa on the eastern tip of the island of Moloka`i.

**Pre-European Contact:** Polynesian speaking peoples have inhabited the islands of the Pacific for 2,000 years or longer in the eastern Polynesian islands, including the islands of Hawaii. The Polynesians were farmers and fishermen with elaborate social hierarchies and many gods. In Hawaii, the domesticated animals were pigs, dogs, and chickens. The staple crops were taro, sweet potato, yams, bananas, and sugar cane. Farming was done in irrigated pond fields and dry land gardens. Fishing was done from land and by outrigger canoe using nets and hooks. Religions were practiced in places of worship (heiau), which included royal war temples, local agricultural temples, fishing shrines, special activity shrines and family shrines.

**Post-European Contact:** Kalaupapa's written history starts with a note on the establishment of the Protestant Church in 1838, about 50 years after Hawaii's first contact with the English explorer, Captain Cook. Services were conducted by foreign ministers from the mission station of Kalua`aha, on the other side of the island. Kanakaokai, a native teacher from a mission school in Maui came to Kalaupapa in 1839. He taught school and was a leader in the community. During the mahele (land laws, 1848-1850, which divided up lands among the chiefs and the government and established property rights for commoners), Kanakaokai was given a large parcel of land in Kalawao. His grave is outside the churchyard at Siloama, the Protestant Church in Kalawao, and is the oldest identified grave on the peninsula. A stone church built by the Protestants in 1853 still stands at Kalaupapa, the settlement's oldest existing building. Today, the church is used as a fire house by the National Park Service. Hawaiians lived in grass houses thatched with pili grass, grew taro, and sweet potatoes. They raised pigs, chickens, and dogs. In the 1800s, almost every family had a horse.

During the California Gold Rush of 1849, Kalaupapa became a primary port of call for ships taking sweet potatoes to California. Rock walls were built to protect the crops from the relentless trade winds, and today, acres of field walls blanket the peninsula. One ancient variety of sweet potato can still be found growing in a protected area near the Kalaupapa Lighthouse.

In 1865, the Kingdom of Hawaii established a quarantine settlement for people with leprosy at Kalawao, on the eastern side of the peninsula. By 1894, the settlement grew to occupy the entire

peninsula and its valleys. Father Damien, a Catholic priest from the Congregation of Sacred Hearts, came to Kalawao in 1873 and was the most famous of many who came to care for the sick and improve the lives of the banished outcasts. Brother Dutton, who managed the Baldwin Home for Boys, and Mother Marianne, who managed the Bishop Home for Girls, are also prominent care givers who came to Kalaupapa in the 1800s. Prominent patients include Peter Kaeo, cousin of Queen Emma, and William Ragsdale, a popular Hawaiian orator and lawyer during the late 1800s. There are many stories to be told at Kalaupapa: man's inhumanity to man, man's triumph over adversity, man's faith in God, man's quest for dignity, man's compassion for others. Shortly after World War II, sulfone drugs were developed, which provided a cure for leprosy, now called Hansen's Disease. Victims of the disease were no longer contagious. Access to the settlement is still restricted, but tour groups have been a regular feature at Kalaupapa since the 1970s.

**Maritime History:** Kalaupapa is a spit of land extending from the desolate northern sea cliffs of the island of Moloka`i. The surrounding seas are often turbulent and unpredictable. The coastline is rocky, but the western side of the peninsula, where Kalaupapa is located, offers protection from the prevailing tradewinds and rough seas. There are a few good beaches on the western side of the peninsula, where canoes and small boats can land. In ancient times, Kalaupapa was a refuge for fishermen waiting out a storm, or for the ali`i (royalty) as they travelled between the islands. After 1865, Kalaupapa became the regular destination of inter-island boats carrying a cargo of outcast victims of Hansen's Disease, along with their food and supplies. There is one notable shipwreck. The inter-island steamer, Ka`ala, became stranded on the reef in 1932 and was abandoned. Today, the rusted engine block can still be seen jutting out of the water. At the tip of the peninsula, on a rise, stands a lighthouse that was once one of the most powerful in the Pacific. It was built in 1908, rises 138 feet above the ground, and once contained a fresnel lens that weighed several tons. The famous fresnel lens has recently been returned to Kalaupapa and is being prepared for display. The Moloka`i Light was placed on the National Register of Historic Places in 1982.

## Summary of Significant Resource Values

Kalaupapa National Historical Park abounds in significant cultural and natural features. The Kalaupapa peninsula is best known for the Hansen's Disease settlement at Kalawao established in 1866. Less well known is the fact that a sizeable native Hawaiian population inhabited the peninsula long before it became a Hansen's Disease settlement. Except for the few early historic accounts, the only records of this occupation are the extensive, well-preserved and largely unexplored archeological remains. The natural resources of the park, although seemingly limited at first glance, are significant on an international scale due to loss of similar habitats in other locations. The following resources have been identified as significant:

-The Hansen's Disease patients, who continue to live in Kalaupapa, are the primary resource for the park. Their presence, knowledge, and background make this park unique in the national park system.

-The 400 homes, churches, monuments, and associated structures, which interpret the history

of the settlements, are a tangible reminder of life at Kalaupapa. Two of the most important structures are the two churches at the site of the original settlement in Kalawao. One of the churches was remodeled by the internationally famous Belgian priest, Father Damien de Veuster.

-The historic information and objects collected by both patients and the Park Service provide knowledge and insight into the lives of the residents of Kalaupapa. These objects help to tell the story of the settlements.

-The archeological remains including the stone ruins of ancient temple sites, which provide clues to the history of the native Hawaiians who lived on the peninsula and in the valleys before the area became a Hansen's Disease settlement.

-The natural resources including examples of native ecosystems which contain rare native plant and animal species.

## Resource Management Objectives

The resource management objectives are the basis for the actions developed in this plan. These objectives were developed in the park's 1987 Statement for Management:

-Recognize that the resident patients are the most important park resource, preserve their current lifestyle and provide a well-maintained community for as long as they wish to remain at Kalaupapa.

-Preserve the historic structures and sites of Kalawao and Kalaupapa settlements.

-Preserve the sites and structural remains of the early Hawaiian period and historical period in cooperation with native Hawaiian organizations and interest groups.

-Protect the park's remnant native ecosystems, including endangered species, from further depredation and competition by those plants and animals introduced by modern people.

-Provide for safe, responsible storage and care of the park's significant collections. Limit future additions to park collections to those specified within the "Scope of Collection" statement.

-Complete archeological surveys and archeological base maps for entire park, including submerged resources.

-Conduct and encourage natural history research looking at (1) further definition and insight into the park's native island ecosystem, (2) developing life history and ecologic understanding of species facing extinction, and (3) developing management strategies for preserving endemic

island ecosystems.

-Complete basic studies needed for planning and management, including natural resources, marine and other water resources, preservation and interpretive plans.

-Encourage research in other fields or natural history and ethnography that relate to park resource management objectives by other organizations and individuals.

## Identification of Resource Issues

Several threats prevent the park from meeting the Resource Management Objectives. These threats can be grouped in four major areas as listed below and described in detail starting on page 20. Addressing and mitigating these threats is the focus of this plan. The threats have been divided into more specific issues to allow for better definition and more realistic solutions to the problems facing the park. Finally, the project statements listed under the issues, provide the most detailed description of current knowledge, information needs, and alternative solutions necessary to resolve specific problems related to the identified issues. Successfully resolving the issues depends upon wise management and availability of funds. Project statement descriptions are listed starting on page 40.

Certain project statements are related to more than one threat to the resources. In such cases, they are listed under the threat which they focus on. In addition to the threats to the park, there are other concerns which the park needs to address. These are listed under miscellaneous concerns. Many times the miscellaneous concerns involve integrated natural and cultural resource management issues.

**THREAT TO RESOURCES FROM NON-NATIVE FLORA AND FAUNA**

Degradation of Park Resources Due to Non-Native Animals

-Control Ungulates in Kauhako Crater (SEA)
-Control Ungulates on Sea Cliffs (SEA)
-Control Ungulates on Pu`u Ali`i Plateau
-Monitor and Control Non-Native Animals Around Settlement

Degradation of Park Resources Due to Non-Native Plants

-Develop Alien Plant Control Plan for Archeological Sites
-Eradicate Invasive Alien Plants in Pu'u Ali`i Plateau
-Control Localized Populations of Non-Native Plants

Impacts on Threatened, Endangered, and Other Sensitive Plants

-Determine Status and Preserve Endangered Plant - Carter's Panicgrass
-Monitor and Manage Endangered and Threatened Plants

**THREAT TO OBJECTS AND BUILDINGS FROM NATURAL ELEMENTS (i.e. climate, fire, etc.)**

Protection from Climate, Insects

-Establish Curatorial Cyclical Maintenance Program
-Revise Collection Storage Plan and Scope of Collection Statement and Prepare Collection Management Plan and Preservation Guide
-Review/Revise Priority and Treatment Recommendations List
-Base Fund Preservation Maintenance Carpentry Crew
-Base Fund Cyclic Building Projects
-Base Fund Building Restoration Crew
-Restore Tombstones of Kalaupapa

Protection from Fire

-Develop and Train Volunteer Fire Brigade
-Implement Fire Protection Plan for St. Philomena and Siloama Churches
-Develop an Urban Interface Fire Management Plan
-Research and Control Hazardous Fuels

**THREAT TO RESOURCES DUE TO A LACK OF KNOWLEDGE**

Cultural Resources

-Conduct Archeological Aerial Survey of Kalaupapa
-Conduct Archeological Survey of Waikolu Valley
-Prepare Ethnographic Overview and Assessment
-Prepare Cultural Landscape Inventory and Report
-Conduct Inventory Condition and Assessment (ICAP) Report
-Conduct Archival Research for Pre-1866 Kalaupapa
-Compile Inventory of Historic and Scientific Materials
-Conduct Study of Vegetational History and Changes at Kalaupapa
-Conduct Archival and Archeological Research on Mahele Awards
-Conduct Archival Research of 1840's Sweet Potato Industry
-Conduct Archeological Survey of Collapsed Lava Tube (Kauhako Trench)
-Conduct Archeological Survey of Kauhako Crater
-Conduct Archeological Survey of Makanalua
-Conduct Archeological Survey of Kalawao
-Conduct Archeological Survey of Kalaupapa
-Conduct Archeological Survey of Nihoa
-Conduct Underwater Archeological Survey of Submerged Lands Surrounding Kalaupapa

Natural Resources

-Research Status of Green and Hawksbill Turtles Within Park
-Inventory Vascular Plants and Vegetation
-Determine Status of Biological Life in Waikolu Stream
-Establish Monitoring Program in Coastal Strand Vegetation (SEA)
-Develop Cave Management Plan
-Monitor Remote Area Weather System (RAWS) Data

-Research and Consolidate Information on Park's Avifauna
-Inventory Current Distribution and Abundance of Bird and Bat Populations in SEAs
-Inventory Kauhako Trench/Lave Tube (SEA)
-Inventory and Monitor Ungulates Within Park Boundaries
-Acquire and Compile Comprehensive Photo Documentation of Kalaupapa NHP
-Inventory Prehistoric Avifauna from Caves, Dunes, Cliffs, and Other Appropriate Sites
-Inventory of Biotic and Physical Resources of Lake Kauhako
-Inventory Marine Reef for Aquatic Life
-Inventory Land Mollusks in SEAs
-Design and Implement Long-Term Vegetation Monitoring Program
-Develop and Implement Regular Monitoring Program of Birds in Selected Areas and SEAs
-Inventory Rat Species in SEAs
-Inventory Arthropod Taxa in SEAs

**THREAT TO RESOURCES FROM THE ACTIONS OF HUMANS**

Water Quality and Rights Issues for Waikolu Stream

-Inventory Water Rights, Uses, and Requirements for Waikolu Stream

Degradation of Marine Water Quality Due to External Activities

-Evaluate Nearshore Marine Water Quality
-Monitor Pelagic Shoreline Debris
-Develop Oil Spill Contingency Plans

Other Issues

-Develop a Regional Management Plan

**OTHER MISCELLANEOUS & INTEGRATED CONCERNS**

-Revise General Management Plan (GMP)
-Prepare Interpretive Prospectus (IP)
-Revise National Historic Landmark Nomination
-Develop Trail System Plan
-Implement a Geographic Information System
-Develop Data Management Plan
-Develop Monitoring Protocols
-Construct and Maintain Ethnobotanical Garden in Kalaupapa

## Land Status, Uses and Planning Relationships

The national park boundaries encompass the isolated Kalaupapa peninsula, the submerged lands and waters extending 1/4 mile offshore, three interior valleys, and the adjacent cliffs ranging from 1,600 to 3,000 ft. in elevation. The peninsula is in Kalawao County, governed by the Director of the State Department of Health. The director may adopt such rules and regulations as considered necessary.

Kalaupapa became a national park in 1980, and is still administered by the Hawaii State Department of Health. Kalaupapa NHP differs significantly from other national parks in that nearly all of the 8,725 acres of land, 2,000 acres of water, and improvements within the authorized boundary may remain in non-Federal ownership to be managed by the National Park Service through cooperative agreements. Land within the national park boundaries is owned by the State of Hawai`i, Departments of Health, Land and Natural Resources, Transportation, and Hawaiian Home Lands; and small private holdings at the top of the cliffs. The national historical park only owns 23 acres surrounding the Coast Guard Lighthouse.

The park has formal cooperative agreements with the State of Hawai`i, Departments of Health, Transportation, Hawaiian Home Lands, and Land and Natural Resources. The cooperative agreements allow for certain shared responsibilities. Each cooperative agreement is valid for a certain time period and can be renewed after that time. As the patient population decreases, the Kalaupapa Division of the State Department of Health will be receiving less financial support from state and federal sources. With this decrease in funds, more maintenance and other responsibilities will presumably be turned over the national park. Documentation of the change in maintenance and other responsibilities needs to be planned for and formalized, so the national park can adequately prepare for the increase in responsibilities. Currently, the park's efforts should be directed at those management programs not being carried out by the Department of Health (DOH) including historic preservation responsibilities and natural resources protection.

| Cooperative Agreements | Expires |
|---|---|
| Hawaii Department of Health | 2004 |
| Hawaii Department of Hawaiian Home Lands | 2014 |
| Hawaii Department of Land & Natural Resources | 2009 |
| Hawaii Department of Transportation | 2007 |
| U.S. Coast Guard | 2000 |

The question of land ownership will become more significant as the patient population at Kalaupapa decreases. The national park service has a vested interest in owning the land to preserve the history and resources of the area. However, due to the restrictions placed by the enabling legislation (Public Law 96-565), the park service can only obtain state lands by donation or exchange. At this time, there is no guarantee that the National Park Service will be able to officially hold title to any more land than the 23 acres surrounding the light house. Since preservation is its mandate, the National Park Service views the perpetual preservation and interpretation of the Kalaupapa peninsula as the best choice for the future of the area. However, other agencies managing land within the park have different mandates and different views of the best choices for the area. The National Park Service's role and future of the Kalaupapa peninsula is not guaranteed unless more of the lands within the park's boundaries are donated or exchanged for other property.

Another land status issue concerns streams within park boundaries. The National Park Service is

responsible for managing all lands, terrestrial and aquatic, within their boundaries. The State Department of Agriculture, however, also has claim on certain streams in Hawaii for water supply to humans. The key question is who has the right to determine the use for the water from the park's sole perennial stream located in Waikolu Valley. Resolution of this question will allow for a more definite approach to management of the aquatic and riparian ecosystems.
Adjacent land use is largely compatible with the ideals of the park service. The lands along the southern boundary, at the top of the cliffs, are state lands in forest reserves. Generally, use and management practices allowed on such lands enrolled in the forest reserve system are compatible with park values. Further, all lands east and south of the upper Waihanau valley have been zoned Conservation by the state. Most of the adjacent lands to the west and south of the park are zoned Agricultural. This land, once used for growing pineapples, is now used for cattle grazing.

Hawaiian Home Lands, along the southern border of the park as well as the ahupua`a (division) of Kalaupapa, are currently zoned Conservation and/or designated Forest Reserve to protect watershed, scenic, historic and park values. However, such land use regulation may not be binding with respect to future use of Hawaiian Home Lands, which could become available for home sites.

The area immediately south of the upper end of Waikolu Valley has been leased from Moloka`i Ranch by The Nature Conservancy and is being actively managed to preserve the native Hawaiian ecosystem. East of Waikolu Valley and the Pu`u Ali`i Plateau is Pelekunu Valley. This is another holding by The Nature Conservancy and is being managed as a preserve.

The submerged lands surrounding the peninsula are owned by the State of Hawai`i and are included in the Conservation District designation.

## PRESENT RESOURCE STATUS

### Cultural Resources Baseline Information

Baseline information for the park's cultural resources is limited. Most of the documents listed in the "Cultural Resources Documentation Checklist" (Appendix B) are not complete. Related and important information has been gathered in various National Park Service and University of Hawaii reports and other books published on Kalaupapa's cultural resources. A bibliography of archeological and cultural resources reports (focusing on archeological information) was compiled by Park Archeologist, Earl Neller (Appendix E).

### Cultural Resources

The cultural resources of Kalaupapa are distinct and varied. The resources range from the living Hansen's Disease patients to pre-historic and historic archeological sites scattered throughout the peninsula.

**Ethnographic Resources:** The most outstanding resources are the 74 resident patients, currently aged 53 to 97, living in the Kalaupapa settlement. Their knowledge, memories, and mementos of life in the settlement provide outsiders with a glimpse of the hardships and resulting strengths of the members of this unique community. Anwei Skinsness Law has done extensive historic research and oral history interviews at Kalaupapa. She has interviewed many of the patients, other residents and people associated with the park over time.

Stories of the current generation are being collected by a writer, Valerie Monson, living at Kalaupapa for one year. Her goal is also to record stories of recent and current events at Kalaupapa for documentation and future interpretation. Stephanie Castillo, producer of "Simple Courage," a video on Hansen's Disease and AIDS patients, is collecting footage to be edited later for future interpretation and education.

The history of Hansen's Disease in Hawai`i and the Kalawao/Kalaupapa settlements can be divided into five eras. The first spanned almost 50 years (1866-1910) and was characterized by fear and hopelessness which drove those suffering from the disease into hiding to avoid being sent to Kalawao. Many patients continued to live in their communities after the onset of the disease and, as a result, cases were far advanced by the time they reached Kalawao Settlement. With a few exceptions, life spans were short. It was an era of "fad cures" and a time when the humanitarian sacrifices of dedicated people brought the attention of the world to the needs of the people quarantined at Kalawao (Father Damien, Brother Dutton, and Mother Marianne Cope).

The second era (1910-1929) was an era of advancement. Comprising roughly 20 years, it witnessed strides in the scientific knowledge of the disease and major improvements in physical conditions at the settlement. The development and widespread use of chaulmoogra oil as a treatment for the disease brought an element of hope to the situation. Persons in the early stages of the disease began

to volunteer for treatment. Early diagnosis and treatment resulted in a lengthening of lives and some patients from this era would live into their 70's, 80's, and 90's. Attitudes toward the disease started to change.

The third era (1930-1945) saw changes in structure, administration, and attitudes. It was a time of great change but also a time of extreme hopelessness for the patients because faith in chaulmoogra oil had faded and, once again, Hansen's Disease was regarded as incurable. By 1932, Kalawao Settlement was virtually abandoned in favor of Kalaupapa.

The fourth era (1946-1969) witnessed great medical progress which led to repeated debates over the need for isolation of patients. Introduction of the sulfone drugs as a cure for the disease in the 1940's led to the eventual abandonment of the old isolation policies in 1969. Sulfone was called the "miracle drug" and patients commented that they noticed changes "overnight." In the late 1940's, some of the physical barriers between patients and non-patients were removed and a number of entertainers visited the settlement. These included Shirley Temple, John Wayne, the Trapp Family singers, Red Skeleton, Edward G. Robinson, Edgar Bergen and Charlie McCarthy. The new lease on life provided by the sulfone drugs resulted in an increase in activities and athletics at the settlement. Patients living during this period were fortunate enough to benefit from these antibiotics, and, by the 1950's, life spans began to mirror those of the general population.

The fifth era (1969-present) is a time when outpatient treatment is the norm except for those representatives of the previous era who have chosen to remain at Kalaupapa. It is an era with its own set of problems as immigration patterns result in an increase in new cases of the disease. However, it is also an era which possesses the knowledge with which to solve these problems. Much attention is being focused on the previous four eras for it is realized that there is much to be learned from them.

Due to the history of the settlement and treatment of the patients, Public Law 96-565 (Sec. 106) outlines the rights of the Hansen's Disease patients living at Kalaupapa. These rights include the right to limit public visitation to the settlement to no more than 100 persons in one day. Patients also have the right to take and utilize fish and wildlife resources without regard to Federal fish and game laws and regulations and the right to take and utilize plant and other natural resources for traditional purposes in accordance with applicable State and Federal laws.

A sizeable native Hawaiian population lived on the peninsula before it became a Hansen's Disease settlement. Their traditional use activities were finished by the 1860s when they were moved off of the peninsula to accommodate the Hansen's Disease settlement. Information on those activities may be available from descendants of those who lived on the peninsula before 1866.

**Objects:** In addition to the oral histories, many patients have also loaned or donated objects to the park service. These donations and photographs are another unique cultural resource for the park. As of 1992, there were 11,614 historical objects in the park services' collection. These range from button-hooking adaptations to tennis rackets to hospital X-ray equipment.

Unlike other national parks, Kalaupapa contains a dynamic living population. The national park's collection will expand with continuing and increasing donations from patients and other residents. However, issues including storage and exhibition of objects need to be resolved. Curation of the collection process is needed on a full time basis. Donations to the park service increase during the times temporary curators and catalogers have been at the park. Currently, the one climate-controlled storage box that the park service uses to store objects and photographs is full. In addition to this storage box, a large-capacity, permanent preservation area needs to be planned and built to protect the growing collection on a long-term basis. Museum space is also a future necessity.

Two museum quality exhibit cases have been constructed and installed in the Cooperating Association Bookstore (historic AJA Hall). About 30 objects, many on loan from residents, are now on display.

**Structures:** The structures described on the List of Classified Structures (LCS) are also an important resource for Kalaupapa. There are currently 56 buildings, 1 archeological ruin, and 5 historic sites included on the LCS for Kalaupapa. These range from a lava rock shelter to patient's residences to St. Philomena Catholic Church and the Moloka`i Lighthouse. The list is incomplete, however, and needs to be updated. Since maintenance on all the structures listed would be close to impossible, the buildings have been prioritized (Appendix F & G). The priorities are important because there is not adequate funding to stabilize and preserve them all. Experience shows that any structure not receiving maintenance or stabilization treatment will literally be gone within four or five more years. However, the priority list needs to be revised taking into consideration the current status of some buildings and the park's need for buildings now and in the future.

A three-volume Building Inventory was completed by the NPS in 1977, and Laura E. Soulliere and Henry G. Law completed an evaluation of the architectural significance of the buildings in 1979. Linda Greene completed a Historic Resource Study, "Exile in Paradise" (1985). This report includes the historic significance of the buildings at Kalaupapa and discusses their uses and dates or periods of construction. A Denver Service Center team produced a Historic Structure Report on St. Philomena (Father Damien's) Church prior to preservation treatment done in 1988, which was financed by over $500,000 in donations.

The National Register listings are incomplete. The entire park is listed on the National Register as a National Historic Landmark (Kalaupapa Leprosy Settlement). The U.S. Coast Guard Moloka`i Lighthouse is listed separately on the National Register. Appendix F (Priority and Treatment Recommendations List) additionally annotates the structure's National Registry status.
The listing is incomplete in the sense that no comprehensive cultural resource inventory of the park has ever been made. Although the National Historic Landmark status is based upon both historic and archeological resources, our knowledge of the archeological resources is particularly fragmentary. Until we have completed an inventory of all the resources in the park, both historical and archeological, the National Register listing must be considered as incomplete.

For the most part, the 400 or so structures remaining of the historic period are wooden, laced with ground and air termites, rot, mildew, and encroaching tropical vegetation. Uncared for, such a structure disappears in five years or so. If wood of an abandoned structure is of termite-resistant quality, it is frequently "recycled" into a new shed or garage elsewhere.

The National Park Service has made extensive stabilization efforts on the highest priority historic structures. Primarily, efforts were to fumigate, paint exteriors, and fix roofs to prevent further damage by termites and moisture. Despite the efforts, some buildings recommended for preservation in the 1977 and 1979 reports are now gone.

**Archeological Sites:** Archeological sites are found throughout the park. The sites can relate information as to the history of people living here before the Hansen's Disease settlement was started. These sites are threatened by alien vegetation, animals, and, on occasion, construction.

In 1983 to 1984, the National Park Service archaeologists, Gary Somers and Ed Ladd, conducted the first systematic, intensive archeological survey at Kalaupapa in conjunction with the park's plans for upgrading the Settlement's water supply. A total of 333 acres were surveyed. The fieldwork provided two general conclusions:

> First, the peninsula was intensively utilized prehistorically and historically and archeological features can be expected to be found anywhere and everywhere. Second, bulldozing and land clearing have destroyed many archeological features and have disturbed the archeological record in and around Kalaupapa Settlement and along the road and the pastures on the way to Kalawao.

In 1986, Somers also studied two eroding human burials at the beach at Ho`olehua. One was the bones of a young Polynesian woman buried with a young chicken. The other was the bones of an older woman of possible non-Polynesian ancestry. Both were believed to be prehistoric. Also in 1986, Martha Yent surveyed three well sites in Waikolu, noting numerous agricultural terraces.

In 1988, Stephen Athens conducted a reconnaissance survey of lands at the west end of the airport, locating 33 sites. In 1989, Thegn Ladefoged continued with the airport project survey work, conducting an intensive survey of lands at both ends of the airport, including test excavations. He recorded 49 sites, including residential sites, agricultural fields, and a possible shrine site. In 1991, Mac Goodwin conducted salvage excavations at three sites for the airport project. Also in 1991, Earl Neller conducted surveys for the National Park Service covering 95 acres and recording almost 300 sites.

A full-time, permanent archeologist was added to the park staff in 1992. As of 1993, almost 500 acres have been surveyed intensively, which is about 12% of the lowland areas expected to contain sites. About 475 sites have been recorded with a level of documentation sufficient for National Register purposes; however, the National Historic Landmark nomination has not been revised. Many survey reports are still being written.

**Cultural Landscapes:** Human occupation of the area extends from as early as A.D. 1000 to the present. Landscape remnants from several different time periods contribute to the park's listing on the National Register of Historic Places. The park is also still in the historic period with an active resident patient community. Therefore, the existing historic scene is dynamic.

Physical remains from all these periods, prehistoric and historic, are still visible within the park. These include hundreds of stone features, an extensive agricultural field system of rock walls, Moloka`i Lighthouse, two churches in Kalawao, approximately 400 structures in Kalaupapa Settlement, and numerous cemeteries, both marked and unmarked.

## Cultural Context/Theme

Although best known for the Hansen's Disease facility established in 1866, a sizeable native population occupied much of what is now the park from as early as 1000 A.D. The number and types of archeological resources and their excellent state of preservation make Kalaupapa NHP one of the most valuable archeological preserves in Hawai`i. In pre-contact times, the inhabitants relied on both marine resources and subsistence agriculture. During the early historic period, the area became famous for its production of sweet potatoes and hogs. Miles of low, stone walls, perpendicular to the prevailing winds, remain as evidence of the potato boom during the late 1840's and early 1850's. During 1851, over 100,000 barrels were exported from the peninsula, mostly to California. Kalaupapa NHP preserves these significant archeological sites and features, both prehistoric and early historic.

In the thematic analysis, History and Prehistory in the National Park System and the National Historic Landmarks Program (1987), Kalaupapa NHP represents:

I. Cultural Developments: Indigenous Population (Theme)

B. Post-Archaic and Pre-Contact Developments (Subtheme)

21. Late Prehistoric Adaptations in the Central Pacific (Facet)

From 1866 and continuing today, most of the area within the park boundary has been devoted to the care and treatment of people afflicted with Hansen's Disease. Therefore, in the thematic analysis, Kalaupapa NHP represents:

XXXI. Social and Humanitarian Monuments (Theme)

K. Emergency Aid and Health Care (Subtheme)

Hansen's Disease in Hawai`i (Facet)

## Natural Resource Baseline Information

The Kalaupapa peninsula and the adjoining valleys of Waihanau, Wai`ale`ia, and Waikolu have been divided into habitat zones based on current vegetation patterns. These patterns reflect local differences in geological substrate, rainfall, wind patterns, and temperature. The zones are montane wet forest (1283 acres), lowland wet forest (2152 acres), lowland mesic forest (893 acres), coastal shrubland (476 acres), coastal dry mixed shrubland (258 acres), coastal grassland (154.4 acres), coastal sand dunes (105 acres), inland pond (8 acres), tidal flats (120.6 acres), and sea cliffs (3460 acres). These categories are based on current vegetation, mapped using aerial photographs. The changing landscape is still undergoing succession, from pasture lands to forest. However, these zones reflect potential natural habitat zones. Within these zones, very little baseline information is known.

Natural resources baseline data for Kalaupapa National Historical Park does not meet the standards recommended by the "Standards for Natural Resources Inventory and Monitoring" (NPS-75). The park is lacking inventories and status reports of almost all major plants and animals found in the park. The park is required by law to protect and preserve federal and state-listed endangered and threatened flora and fauna. At least nine federally listed endangered or threatened plants are known to survive within the park boundaries. Baseline information on these plants, needed to make sound management decisions, is missing.

Necessary baseline data for biological resources includes compiling a historical data base, geography of the park, and a complete species list. The species list is to include vascular plant, vertebrates, federal and state endangered and threatened species and other species important to the park (i.e. endemic or alien plants). For chemical and geophysical resources, the standards recommend compiling a historical data base on the geology, soils, hydrology, climate and chemistry of the water and atmosphere in the park. Baseline data recommended by NPS-75 also includes identifying scenic vistas (for later monitoring) and locating and classifying water resources with a basic description of water quality including chemical constituents and aquatic biological inventories.

Selected areas of Kalaupapa National Historical Park have been studied and information is available for certain areas in the park. Reports that increase the understanding of Kalaupapa's natural resources include the following documents:

1. State Department of Land & Natural Resources : Stream Assessment prepared by the National Park Service (December 1990).

2. A plant survey for Waihanau and Wai`ale`ia valleys in conjunction with proposed drilling (1982).

3. A survey of Kauhako Crater Lake including information on size, depth, water quality, and biota.

4. A botanical survey of Kauhako Crater (1986, CPSU/UH).

5. Description and map of plant communities in northeast coastal spray zone (1987, CPSU/UH).

6. Vegetation map of park, compiled from existing information.

7. Hawai`i Forest Bird Study (HFBS) is doing periodic surveys along established transects in the upper valleys, cliffs, and rain forest areas of the park (1988, USFWS).

8. Vascular plant list including endangered species for Pu`u Ali`i Natural Area Reserve (1989, State of Hawai`i, Natural Area Reserves System).

**Natural Resources**

As discussed in the introduction, preservation of the natural resources of Kalaupapa NHP is one of the principal purposes of the park. However, many of the important natural resources within the park have not been inventoried, but it is likely that everything from native birds to native land mollusks call Kalaupapa their home. Most of the peninsula is covered by non-native plants, which are encroaching upon the scattered remaining areas of native plants. The remaining areas of native plants also are likely to contain native animals.

Areas containing valuable natural resources including native plants and animals have been designated as Special Ecological Areas (SEAs). These have been determined to be the most intact, diverse, unique and manageable sites in the park. These areas need to be managed to preserve the ecosystem as a whole and, in doing so, preserve the native plants and animals found there. As shown on Map 2, at the end of this document, there are eight SEAs within Kalaupapa including: the coastal spray zone on the northeast shore of the peninsula; Pu`u Ali`i Natural Area Reserve; Waikolu Valley; the Kauhako Crater; caves and lava tubes; the Kauhako Trench/Lava Tube; the cliffs (pali); and the submerged lands surrounding the peninsula.

All of the SEAs need to have monitoring programs and protocols developed and management plans outlined. Monitoring and management programs for each of the areas are discussed in the project statement section. Listed below is a brief description of the natural resources found within each of the Special Ecological Areas:

**Coastal Spray Zone:** This area is located along the northeast shore of the peninsula and is one of the best examples of the vegetation type in the state. The spray zone contains plant communities dominated by native species. The community contains at least one threatened plant, Tetramolopium rockii var. rockii.

**Pu`u Ali`i-`Ohi`alele Plateau:** This area is in the southeast corner of the park and supports one of

the best examples of `ohi`a rain forest in Hawai`i and is an essential habitat for rare and endangered native forest birds including the Moloka`i creeper (Paroreomyza flammea). This area is currently operated by a cooperative-operating agreement with the State of Hawai`i's Department of Land and Natural Resources. The area is designated as a Natural Area Reserve by the state and access is limited.

**Waikolu Valley:** This valley contains the park's sole perennial stream. Native fish found in the stream include Lentipes concolor (o`opu alamo`o), which is under consideration by the U.S. Fish & Wildlife Service for listing as a threatened species under the Endangered Species Act. The stream also contains other native diadromous fish and mollusks. The area contains federally endangered plants including Carter's panicgrass, Panicum fauriei var. carteri; Cyanea procera, and Melicope reflexa. Threats to the stream and valley ecosystem are tied in with water rights and uses.

**Kauhako Crater:** The rim of the crater (elev: 123 meters) is about 2 miles in diameter. The crater was formed by the Pu`u Uao volcano and contains remnant `Ohe-wiliwili forest also known as Summer-Deciduous Dry Forest. This is the only remaining windward coast community of its type known of in the state. Much of the land within the crater has been used for agriculture. There are numerous remaining rock walls and other signs of use. At the bottom of the crater, there is an anchialine lake which, at less than one acre in surface area, hides its remarkable depth of 248 meters. Such depth, especially for water so small in surface area, results in morphological and chemical features that qualify Kauhako as one of the most unusual lakes in the world. The lake contains a sub-species of shrimp, which may be unique to this lake.

**Lava Tubes/Caves:** Throughout the park, there are nearly 20 known lava tubes and caves. They are remnants of larger caves plugged by siltation, breakdown, or subsequent lava flow. Most of these caves are parts of three lava tube systems. The caves contain uninventoried flora and fauna. The caves also may contain cultural resources from past human use. Other caves may exist because the pahoehoe lava characteristically forms roofed-over channels as it flows. There is also the possibility of caves in the cliffs above the peninsula. Such caves await discovery.

**Kauhako Trench:** This is a major lava tube running north from Kauhako Crater. It is about one mile in length. Several portions have collapsed allowing vegetation to become established in an environment protected from wind and ocean spray as well as browsing and trampling by cattle, deer and pigs.

**Cliffs (Pali):** The 2,000 to 3,000 foot cliffs separate the peninsula from the rest of the island of Moloka`i. In many places native plants survive, due to the steepness of the cliffs and the inaccessibility to goats, deer and pigs. Currently, three endangered plant species, Canavalia molokaiensis, Schiedea lydgatei, and Peucedanum sandwicense grow on the cliffs. The cliffs probably contain caves and lava tubes, which need to be inventoried for cultural and natural resources. The cliffs are likely to provide nesting sites for native and endangered birds including Newell's shearwater, dark-rumped petrel, and the dark-banded petrel. The cliffs along the entire northeast coast are a National Natural Landmark (1972).

**Marine Resources:** The park's boundary extends for a quarter mile offshore and includes 2,000 acres of ocean, two small islets and wet shorelines which support a wealth of fish and wildlife resources. The islands, `Okala and Huelo, contain two federally endangered plants, Brighamia rockii and Pritchardia munroi?. Sea birds, turtles and porpoises have been seen in the waters off shore and humpback whales are seen between December and March. The current high level of water quality could be threatened in the future by human development and carelessness.

Many of the SEAs and cultural resources within Kalaupapa NHP are facing the same threats. Feral goats, pigs, and axis deer are the major herbivores and largest threat to the SEAs and archeological sites of Kalaupapa. Due to grazing and browsing pressures, these animals represent a major threat to the remaining native plant communities. Mongoose, rats, feral dogs and cats, and introduced birds are also present in large, relatively unchecked, populations.

Invasive, non-native plants are the second threat to the SEAs. Haole koa, Christmasberry, lantana, java plum and other alien plants are threatening to push out the remaining native plants. In addition, the non-native plants have obscured and damaged many of the structures of the ancient Hawaiians, the taro and sweet potato patches, and even the original Hansen's Disease settlement at Kalawao.

## RESOURCE MANAGEMENT PROGRAM

### Overview of Current Programs and Needs

As mentioned previously, Kalaupapa NHP has a wide variety of interesting and unique resources. Protection and preservation of these resources is an important part of the park's purpose. To successfully manage cultural and natural resources in Kalaupapa, the park needs to have open communication with the surrounding land owners and the agencies with whom they have cooperative agreements.

### Major Issues

In addition to good communication between parties, the park managers need to address the threats facing the cultural and natural resources. The threats limit the park's ability to meet its resource management objectives. As mentioned in the introduction, there are five major threats affecting both the cultural and natural resources of Kalaupapa. These five threats are broad but are sub-divided into more descriptive issues. The management goals for resolution of these issues are then outlined as project statements.

Currently, there are five major resource threats facing Kalaupapa NHP:

-Threat to resources from non-native flora and fauna.
-Threat to objects and buildings from natural elements (i.e. climate, fire, etc.).
-Threat to resources due to a lack of knowledge.
-Threat to resources from the actions of humans.
-Miscellaneous and integrated concerns.

The threats and actions to resolve them are discussed in the following section. The project statements are the action plan for the park managers to follow. Successful resolution of these threats and issues will fulfill the park's mandate and ensure the preservation and protection of natural and cultural resources for future generations to enjoy.

**THREAT TO RESOURCES FROM NON-NATIVE FLORA AND FAUNA:** Alien biota is the largest threat to cultural and natural resources. Non-native animals are disturbing areas of native ecosystems. Once a disturbance is created, non-native plants have the opportunity to establish a healthy population and out-compete native plants. Both non-native plants and animals disturb archeological sites and cause rock walls to collapse.

Pigs, goats, and deer, which are not native to the park, are having a devastating impact on native ecosystems. The SEAs are all threatened by one or more of these non-native species. All three species have contributed to the destruction of large areas of native forest and are also damaging damp forests in other north-facing drainages in the park (Waikolu, Wai`ale`ia, Waihanau). In addition, feral pigs have invaded an important remnant example of ohe-wiliwili forest in Kauhako

Crater, a forest type which has been extirpated over most of its range. Ungulates also cause damage to archeological sites. They break down walls to make trails and root at the base of structures damaging foundations.

There is also an abundance of mongoose and rats (both alien to the park) who are having severe impacts on native ecosystems. Some native plant species, such as the loulu palm, have been lost in some areas of the park due to the activity of rats, and mongoose are a threat to native bird populations.

Invasive alien plants are also a significant threat to both the natural and cultural resources of the park. Nearly pristine examples of unique Hawaiian cloud forest as well as other pockets of native Hawaiian vegetation are threatened by the continued and increasing domination of alien plants. Acres of invasive alien plants including haole koa (Leucaena leucocephala), Christmasberry (Schinus terebinthifolius), lantana (Lantana camara), java plum, and strawberry guava (Psidium cattleianum) already cover some historic structures and archeological sites. Many more structures and sites are at risk of being lost because of these invasive, non-native plants.

**Response and Action to Manage Non-Native Animals:** Currently, to fulfill the intent of the park, there is a need to protect certain areas (SEAs) from various non-native animals. The park's strategy for reducing the impact of pigs, goats, and deer on park resources is to remove them from some of the most pristine and unique areas of the park (SEAs) by fencing these areas and then removing the animals from inside. The Pu`u Ali`i plateau, on the northeast boundary of the park has already been fenced and removal of non-native animals from within the fence has begun (Proj. No. N50). Kauhako Crater is in the preliminary planning stages for fencing (Proj. No. N48) and fencing needs are being considered for the sea cliffs (Proj. No. N49).

Monitoring and control of rats, mongoose and feral pigs, dogs, and cats is needed around the Kalaupapa settlement boundary (Proj. No. N35). The further removal of pigs, goats, and deer from other areas and the removal of rats and mongoose from the park is dependent upon more information including inventories, population statistics and damage to native ecosystems (project descriptions for inventories are listed under "Threats to Resources from Lack of Basic Data").

**Response and Action for Non-Native Plants:** In the short term, it is not feasible and perhaps not wise to remove all non-native plants from the park. Currently, not enough information exists on the cycles of the ecosystems. It is possible that the removal of the woody non-natives would allow non-native grasses to take their place, which could increase wild land fire hazards.

There is a need, however, to protect certain natural areas (SEAs), archeological and historical sites from non-native plants. When the vascular plant inventory (Proj. No. N15) is completed and more information is collected, it may become necessary to control non-natives on a park-wide basis. However, currently, the park's strategy for addressing its alien plant problem is to protect identified natural and cultural resources. An alien plant control plan needs to be developed to control non-natives around and covering archeological sites (Proj. No. C25). Management of the Pu`u Ali`i

Plateau (SEA) includes the removal of non-native plants (Proj. No. N51). In addition, populations of localized weeds need to be found and removed on a timely basis to prevent the weeds spreading across the peninsula and adding another threat to the native plants (Proj. No. N52). These small concentrations of non-native plants are usually found along roads and near the dump and the settlement.

**Response and Action for Threatened and Endangered Animals and Plants:** The park provides important habitat for at least four endemic forest birds, including the Moloka`i thrush (listed as endangered by the Federal Government and the State of Hawai`i) and the i`iwi (very rare on Moloka`i although large populations remain on other Hawaiian islands). The entire remaining habitat of these forest birds is currently severely threatened by non-native species, especially feral pigs, goats, axis deer, and several species of habitat-modifying weeds described above.

The most critical action needed to protect the four forest birds **known to be endemic to Kalaupapa?** is to eliminate the non-native animals and plants threatening their important habitat in the forests and shrublands of Pu`u Ali`i and the three northern coastal valleys within the park (Waikolu, Wai`ale`ia, and Waihanau). The park's strategies for accomplishing this are described above. Long-term monitoring of endemic bird populations is also important and is included as part of Project No. N47.

It is important to work with the State Department of Land and Natural Resources, The Nature Conservancy, the U.S. Fish & Wildlife Service, and other interested parties to implement and maintain a cooperative research effort to monitor and better understand the life history of endangered and endemic animals.

Currently, there are at least nine endangered plant species found within the boundaries of Kalaupapa NHP. One plant, Carter's panicgrass (Panicum fauriei var. carteri), is located in a small area, which is heavily grazed and trampled by goats. An immediate solution is necessary to protect this plant (Proj. No. N01). The other endangered plants should be inventoried and monitored on a long-term basis (Proj. No. N04) to guide management actions when needed.

**THREAT TO OBJECTS AND BUILDINGS FROM NATURAL ELEMENTS:** Due to climatic conditions, all of the buildings at Kalaupapa are threatened by rot and insects. Currently, the park is using the List of Classified Structures (LCS) and a "Priority and Treatment Recommendations List" (Appendix F) to determine maintenance priorities. The building priority list was organized by the first superintendent, Henry Law, a historic architect, and Bryan Harry, the NPS Pacific Area Director. There are 56 structures on the LCS and 195 buildings on the priority list, all of which the park service has trouble maintaining due to limited funding and personnel. In determining a revised priority list, future interpretive needs, park service office space and personnel housing need to be considered in addition to the historic preservation needs.

The park's collection of objects and photographs also needs protection from natural elements. Currently, the single climate-controlled storage box is at maximum capacity. A permanent space

with large capacity needs to be planned and built. The park needs to expect increasing donations and plan to catalog and protect these donations accordingly.

In addition to buildings and the collection of objects, a third resource threatened by natural elements are the tombstones found in the 20 remaining cemeteries on the peninsula. Due to climatic conditions, the inscriptions on the tombstones are being lost, and the concrete of the tombstone and grave covering is crumbling. To preserve and restore these tombstones is to preserve a piece of Kalaupapa.

Fire also presents a threat to the buildings. In 1991, the old hospital built in 1932 was lost due to an electrical fire that could not be brought under control when the state's fire truck failed. According to observers, it took 45 minutes for the building to be reduced to ashes. The peninsula is subjected to the trade winds (10-15 mph) which could allow wild land and structural fires to spread rapidly before being controlled. As of 1993, the Park Service has taken over fire protection services for the peninsula. To be properly prepared in case of fire, continued training of the volunteer fire brigade is necessary. Plans also need to be developed to protect the historic area from possible structure and/or wild land fires.

**Response and Action:** To protect buildings from rot and insects, base funding needs to be established for cyclical building projects (Proj. No. C12) and two carpentry crews. One crew will focus on restoration of historic structures (Proj. No. C13), and the other crew will focus on preservation maintenance (Proj. No. C11) on other necessary buildings. In addition, the "Priority and Treatment Recommendations List" (Appendix F) needs to be revised (Proj. No. C09) to reflect the revised List of Classified Structures (LCS), the Park Service's need for buildings, and realistic maintenance goals.

To properly preserve and protect objects from the elements, there are two priorities. First, establish a curatorial cyclical maintenance program (Proj. No. C07) which would put a curator in charge of the collection ensuring it would receive the attention it needs. Second, the curator, along with other resource and park managers, need to revise the collection storage plan and scope of collection statement. A collection management plan and preservation guide (Proj. No. C08) also need to be completed. These documents, if implemented, will ensure adequate future protection.

With the continued training of the volunteer fire brigade (Proj. No. I02) and the implementation of the historic fire protection plan recommendations for St. Philomena's and Siloama churches (Proj. No. C06), the park is better prepared to detect and fight possible fires. In the long run, the park needs to develop an urban interface fire management plan (Proj. No. I17), which would be used to guide fire management practices. In addition to the plan, research on the type of natural fuels and recommendations for control of those fuels (Proj. No. I27) is needed.

**THREAT TO RESOURCES DUE TO LACK OF KNOWLEDGE:** As mentioned in the Natural Resource Baseline Information section, Kalaupapa NHP does not have the basic information on which to make informed management decisions. The park does not meet the guidelines outlined

in NPS-75, "Standards for Natural Resources Inventory and Monitoring." There are also many areas where cultural resources baseline information needs to be improved. There is much unknown about the natural and cultural resources of Kalaupapa and the health of the park ecosystems, and this is a cause of great concern. Until a better understanding of these resources is gained, loss of them to threats which are yet unidentified is possible. Wise management cannot happen without a solid base of knowledge upon which to base resource management decisions. This baseline data is lacking in every area of the park from archeological site information to vascular plant information.

**Response and Action for Cultural Resources:** The strategy for enhancing our understanding of the park's cultural resources has many facets. To gain basic information on Kalaupapa's archeology, archeological site surveys are needed. These include an aerial survey (Proj. No. C32), and archeological surveys and maps of Waikolu Valley (Proj. No. C22), Kauhako Trench (Proj. No. C53), Kauhako Crater (Proj. No. C54), Makanalua (Proj. No. C57), Kalawao (Proj. No. C62), Kalaupapa (Proj. No. C63), Nihoa (Proj. No. C64), and an underwater survey of submerged lands surrounding Kalaupapa (Proj. No. C65). With the completion of these surveys, park managers will have a better understanding and better tools for managing Kalaupapa's archeological sites.

In addition to archeology, other cultural resources needing basic information include ethnography, cultural landscapes, structures, and archives. An ethnographic overview and assessment (Proj. No. C23) is needed to research pre-1866 residents, whose descendants may be living on topside Moloka`i. A cultural landscape report (Proj. No. C24) is necessary to document the landscapes that represent various time periods in both the history of the Hansen's Disease settlements and the landscapes prior to the settlements. With the completion of this report, park managers will be able to develop interpretive and maintenance responsibilities based on the information in the report. A service-wide program, "Inventory Condition and Assessment Program," (ICAP) (Proj. No. C31) requires park managers to inventory all structures in great detail. This information will be used to facilitate restoration and renovation of structures.

Information on Kalaupapa's history is contained in scattered locations including the Bishop Museum and Hawaii State Archives in Honolulu. Archival research is needed to gather information on diverse subjects including pre-1866 Kalaupapa (Proj. No. C21), vegetational history and changes (Proj. No. I34), the Mahele Awards (Proj. No. C39), and the sweet potato industry (Proj. No. C45). It is also important for the park to compile an inventory of materials pertaining to Kalaupapa that are housed elsewhere (Proj. No. C33). This would aid in future research efforts.

**Response and Action for Natural Resources:** To gain more information on natural resources, the park needs to inventory and collect baseline data on most of the flora and fauna found within the park. Protection of federally endangered and threatened plants and animals is required by the federal government. To effectively protect these species, the park must first understand the extent and habits of the species. By researching the status of green and hawksbill turtles (Proj. No. N03), completing an inventory of the vascular plants (Proj. No. N15), and determining the status of aquatic species in Waikolu Stream (Proj. No. N16), the park is fulfilling its mandate to find and protect endangered species. Once the vascular plant inventory is completed, a long-term monitoring

program needs to be established (Proj. No. N46) based on the information gained from the inventory.

The second effort will focus on inventorying cave resources and developing a plan to monitor, manage, and protect them (Proj. No. I20). This project will involve locating and mapping caves; inventorying historical, archeological, faunal, and floral resources in the caves; developing monitoring protocols for these resources and training park staff in their implementation; and preparing a cave management plan. Subsequent monitoring of the resources and management decisions cannot be made without the basic information.

A third effort will focus on avifauna populations. Existing information on the park's avifauna contained in museum collections, surveys, field notes, etc. will be consolidated into a single updatable report to guide management actions and future research efforts (Proj. No. N28). Then, an inventory of bird and bat populations in appropriate upland and lowland areas will be conducted (Proj. No. N43). With the completion of an inventory, a long-term monitoring program will be developed (Proj. No. N47). In addition to the inventory of current bird populations, an inventory of prehistoric avifauna from sites such as caves, dunes, cliffs, etc. using paleontological tools will provide important information for possible re-introduction of species in the future (Proj. No. N41).

Non-native animals are a major threat to the resources at Kalaupapa. Before control actions are implemented, baseline data on population and distribution of ungulates needs to be accumulated (Proj. No. N36). Once ungulate control programs are begun, the inventory data can be used to compare changing population numbers and the effect on the ecosystem. Other non-native species that will be monitored and considered for future control are rats (Proj. No. N67) and mongoose (Proj. No. N35).

In addition to the projects mentioned above, a series of inventory, monitoring, and research efforts will be undertaken to learn more about the native flora and fauna of Kalaupapa. The special ecological areas (SEAs) of the park will be inventoried including the coastal strand vegetation (Proj. No. N18), Kauhako Trench (Proj. No. N30), Lake Kauhako (Proj. No. N42), and the marine reefs (Proj. No. N29). Within the park, land mollusks (Proj. No. N44) and arthropods (Proj. No. N68) will be inventoried and monitored to determine population distribution and abundance. Monitoring of climatic conditions will be done using the Remote Area Weather Systems (RAWS) (Proj. No. N26) located at three elevations throughout the park.

To aid in monitoring resources, a comprehensive, ongoing, photographic documentation program for the park (Proj. No. N38) is needed. This project will include (a) obtaining low-level aerial photographs about every five years; (b) establishing a photo-point monitoring system which will document changes at key sites throughout the park (perhaps annually); (c) the development of a plan and protocols for maintaining, interpreting, and utilizing this information, perhaps with the use of a geographic information system (GIS); and (d) the obtaining of additional historical photographs of the park, the locations of which should be re-photographed to document changes.

**THREATS TO RESOURCES FROM THE ACTIONS OF HUMANS:** Human actions always affect cultural and natural resources. Sometimes those actions are positive, as in the clearing of non-

native plants from archeological sites, but more frequently, actions pose threats to the park's resources. At Kalaupapa, possible human actions of most concern relate to water. Human actions are threatening the park's sole perennial stream, Waikolu, and also marine water quality. The State of Hawai`i is currently withdrawing about five million gallons of water per day from Waikolu Stream. The impact on the natural vertebrate and invertebrate fauna is quite severe. A quarter mile segment of the stream was dry during most of the summer of 1989, a significant interruption of the migration route of the diadromous gobies. There is concern that additional future water withdrawals from the groundwater system could further deplete the base flow of the stream, thus diminishing habitat for indigenous fish and crustaceans. No comprehensive inventory of water rights, uses and requirements has been completed for Kalaupapa.

Marine water quality is also a concern. All domestic wastewater at Kalaupapa, including sewage, is dispersed by cesspools or septic system. Most human habitation is close to shore, where there is little soil. The rock structure is generally porous, and lava tubes occur. The total source of effluent is not large, and the normally strong mixing processes of coastal waters probably dilute contaminants to acceptable levels not far offshore, but it is not clear whether concentrations close to shore may present water quality problems around the concentrated living area of Kalaupapa settlement and near the landfill.

Another issue is the threats reaching Kalaupapa's shore from uncontrolled sources. Drifting manmade debris is carried on oceanic currents and accumulates on beaches and other shoreline substrata. Besides creating an eyesore, marine debris threatens the survival and health of many marine animals including fish, turtles, sea birds, and marine mammals. Plastic items such as derelict fishing nets, can stops, bags, and beads are some of the most damaging materials. Another concern is possible oil spills. The ocean's currents and the peninsula's proximity to shipping lanes make oil spill control a necessity.

A final threat to the park from human actions comes from surrounding neighbors. Currently, relationships with landowners adjacent to the park are ones with good communication. However, it would be in the park's best interest to develop a regional land management plan to lay out goals and priorities for preserving the regional resources as well as those found within the park.

**Response and Action to Threats to Waikolu Stream:** An inventory of water rights, uses, and requirements will be undertaken (Proj. No. N19). Using this information to secure the water rights will fulfill Kalaupapa's management goals and objectives.

In addition to the water uses project, an inventory is being compiled of aquatic species found in Waikolu (Proj. No. N16). When this is completed, it will give information on habitat suitability criteria for key indigenous fish, crustaceans, and mollusk species in Waikolu Valley, and the impact future withdrawals will have on these species.

**Response and Action to Degradation of Marine Water Quality:** A study will be undertaken to determine whether problem levels of contaminants occur in the ocean waters close to shore, and, if

so, to identify the major contaminant sources so they can be controlled or eliminated. Initial analysis will be done at (a) sites near likely contamination input sites (e.g. the intertidal areas near the middle of the settlement and immediately offshore from the main landfill near Kalaupapa beach) and (b) sites near the more populated area on the southwest portion of the peninsula. If high levels of contaminants are found, the number of sample stations will be expanded, crude water circulations studies will be made, and a rough spatial map of contaminant concentrations in near-shore waters will be produced. Observations of algal and benthic invertebrate communities will also be initiated to detect unusual nutrient loads (Proj. No. N37).

Efforts will also be undertaken to reduce the impact of shoreline debris on the visual and biological resources of the park. Systematic monitoring and debris removal along the entire park shoreline will begin on an infrequent basis. Then a more refined schedule of monitoring will be developed, emphasizing the portions of the coast that have been shown to receive the most debris and those that possess the most sensitive fauna. If any of the debris can be traced to local sources, steps will be taken to eliminate their contributions (Proj. No. N55).

Finally, an oil spill contingency plan will be developed to outline the procedures in the event of a spill (Proj. No. N56). This plan will list the Park Service's responsibilities and clean-up agencies to contact.

**Response and Action to Other Resources Human Threats:** To prevent conflicts of interest with neighboring land owners, a regional land management plan should be developed (Proj. No. N59). This would allow for continued communication between landowners and a long-term strategy for the area.

**MISCELLANEOUS AND INTEGRATED CONCERNS:** The park has important concerns which do not fall under one of the specific threats listed above and affect a combination of cultural and natural resources. Some of the concerns are related to revision of necessary National Park Service documents. Once completed, these documents can be used as a tool for park managers to guide Kalaupapa in the future. Needed plans include a General Management Plan, Interpretive Prospectus, a revised National Historic Landmark Nomination, and a trail system plan.

A significant goal for the park is to set up a comprehensive, useful data management system. All research and monitoring programs in the park should be set-up using park standards, which have yet to be developed and following specific protocols. Without a workable data collection system with standards, the park will collect data useless to other researchers. The National Park Service has become involved with Geographic Information Systems (GIS), which allow for computer manipulation of maps. With the expected increase in data during the next years, Kalaupapa needs to set up a GIS station with appropriately trained personnel.

A final concern relates to the construction of an ethnobotanical garden, which would function as an interpretive tool. The construction of a garden would be an excellent, interactive cultural and natural resources interpretive tool.

**Response and Action:** The park superintendent and other resource managers need to prepare and revise the following plans to guide the park in the future: General Management Plan (Proj. No. I05), Interpretive Prospectus (Proj. No. I10), National Historic Landmark Nomination (Proj. No. C14), and a trail system plan (Proj. No. I58).

To deal with the expected increase in data, a data management plan needs to be developed (Proj. No. N60). This plan will outline the systems and storage methods that will make the data most accessible for future use. In conjunction with the data plan, monitoring protocols need to be developed, which would set standards for research within the park (Proj. No. N61). A Geographic Information System would also allow for better management and manipulation of data (Proj. No. I40).

As an educational and informational tool for visitors and residents, an ethnobotanical garden should be started and maintained (Proj. No. I66).

**Funding and Personnel**

Kalaupapa National Historical Park has a permanent staff of fourteen employees of which ten are in the Maintenance Division, one in Ranger Services, and three in Park Administration. There are also six seasonal employees: five in Maintenance and one in Ranger Services. Within the Administration, there is one full-time archeologist, who, along with the superintendent, make cultural resource management decisions. No existing position has full-time responsibility for natural resource activities. Currently, some natural resource activities are done by the maintenance staff including the maintenance of cemeteries, rehabilitation of certain structures, and control of vegetation around a few archeological and historical features.

Tables 1 and 2 (page 30) show the funding and personnel currently used in natural and cultural resources management activities at Kalaupapa National Historical Park. The programming sheets (page 31 and 32) list the cultural, natural and integrated projects that are currently being funded.

**Future Funding and Personnel Needs**

In order for Kalaupapa NHP to carry out necessary baseline research, resource protection, and management activities listed in this plan, an increase in permanent and seasonal staff trained in resource management and protection is needed.

On the next page is a list of base funded personnel positions needed by Kalaupapa NHP to carry out the park's mandate to protect and preserve resources.

<u>Resource Management Program</u>
Resource Management Specialist (GS-11/12)
Administrative Assistant (GS-3/4/5)

Cultural Resources
Curator/Exhibition Specialist (GS-11)
Historic Architect (GS-11)
Restoration Carpentry Crew (2 at WG-7) (2 at WG-5)
Archeological Research & Maintenance Crew (4 at GS-5/7)
Curatorial Assistant (GS-5/7)

Natural Resources
Natural Resources Specialist (GS-9/11)
Vegetation Biotechnicians (2 at GS-5/7)
Wildlife Biotechnicians (2 at GS-5/7)

In addition to future personnel, the housing situation for park staff is a concern. Current housing is limited such that the hiring of permanent and seasonal staff is affected, and volunteer opportunities are restricted. To accomplish many of the resource management goals, additional staff is needed. Without adequate housing, additional staff cannot be hired. Existing houses are acquired from the State Department of Health (DOH). Acquiring houses in good condition is difficult due to climatic conditions and DOH's needs. Constructing houses is currently inappropriate considering the land ownership issues and the historic cultural landscapes. Efforts by park managers need to focus on acquiring and maintaining houses for current and future personnel.

As mentioned earlier, appropriate space for the park's collection and museum display is needed. Other needs to support the cultural and natural resources management programs include a building to house resource management activities and visiting scientists, students and/or volunteers, and a building topside to house equipment for management of topside resources. Additional programming sheets (page 33, 36, and 39) show unfunded cultural, natural and integrated projects that the park looks to accomplish in the coming years.

**Tables**

**Programming Sheets**
Funded Cultural Resources Activities

Funded Natural Resources Activities
Funded Integrated Resources Activities

Unfunded Cultural Resources Activities

Unfunded Natural Resources Activities

Unfunded Integrated Resources Activities

**Project Statements**

## PROJECT STATEMENT

1. Project Number: KALA-N-001

2. Project Title: Determine Status and Preserve Endangered Plant-Carter's Panicgrass

3. Servicewide Issue: N03 - Impacts on Threatened, Endangered and Other Sensitive Plants

4. Problem Statement: Carter's panicgrass (Panicum fauriei var. carteri) is a federally endangered grass found in Kalaupapa National Historical Park at Kukaiwa`a, which is east of the mouth of Waikolu Stream. The grass is threatened by non-native animals including deer, feral pigs and goats, which graze and root in the area. The area is most accessible to feral goats. In addition to the non-native animals, there is also the possibility of invasive, alien plant introductions and/or explosions. A fence line needs to be constructed to eliminate the non-native animals. Before fence line construction, information needs to be obtained on the current status and distribution of the endangered grass species.

5. Description of the Recommended Project: A monitoring program needs to be implemented to determine the status and distribution of the endangered grass. Baseline information is also needed to determine changes in the endangered species population, the effectiveness of herbivore exclusion on other native species, and the status of alien plant populations. Part of the project report would be the delineation of the fence line that does not impact the endangered species, takes advantage of all natural barriers, and ensures as much potential habitat as possible is within the enclosure. It should also measure the length of fence line needed for later budget estimation.

6. Alternative Action/Solution and their Probable Impact: No action would result in the continued destruction of the endangered grass by non-native animals, and its possible extinction in this area.

   Fencing the area without conducting the monitoring program would result in a lack of information as to the effectiveness of the fencing and would be poor management.

7. Compliance: None needed.

8. Funding Requirements:

| | |
|---|---|
| Personnel Services for Monitoring (Contract with University of Hawaii) | $2,000 |
| Travel | 500 |
| Helicopter Travel to Site | 2,250 |
| Supplies | 500 |

| | |
|---|---|
| Total | $5,250 |

## PROJECT STATEMENT

1. Project Number: KALA-I-002

2. Project Title: Prepare and Train Volunteer Fire Brigade

3. Servicewide Issue: N07 - Disruption of Natural Fire Regimes
   C20 - Inadequate Security

4. Problem Statement: In 1993, the National Park Service assumed responsibility for fire protection services for the Kalaupapa peninsula. A fire truck has been purchased and a volunteer fire brigade has been formed. The volunteers need additional training to ensure that they are adequately prepared in the event of a structural fire.

5. Description of the Recommended Project: Continue to train the volunteers on the working of the fire truck and in simulated fire emergencies. The fire chief also needs to develop a reliable information-relay and communication system in the event of an emergency. Volunteers need training, both on and off-site, for structural fires.

6. Alternative Action/Solution and their Probable Impact: No action will result in a poorly prepared fire crew with an increase in response time to fire emergencies. This could result in higher amounts of damage to structures and lives.

7. Compliance: None needed.

8. Funding Requirements:

| | |
|---|---|
| Personnel (GS-9 Law Enforcement 0.5 FTE) | $13,900 |
| Supplies | 2,000 |
| Total | $15,900 |

**PROJECT STATEMENT**

1. Project Number: KALA-N-003

2. Project Title: Research Status of Green and Hawksbill Turtles at Kalaupapa

3. Servicewide Issue: N20 - Lack of Basic Data

4. Problem Statement: No information is currently available on the importance of Kalaupapa's beaches to nesting or basking sea turtles. To adequately protect these federally listed species, we need to determine the importance of the park for nesting and basking and the potential threats to turtle populations and recruitment.

5. Description of the Recommended Project: Systematic monitoring of beaches, particularly during the nesting season (June to November), will be accomplished on a daily basis to determine presence of nest activity. Once nesting activity is confirmed, determination and investigation of threats will be accomplished. Predator control, reduction of human disturbance, alien and native plant control, public education, etc. may be necessary once threats are determined. The involvement of Kalaupapa residents and/or volunteers in enhancing nesting success, and cooperation with the National Marine Fisheries Service to determine population health, structure, and survival may also be worthwhile eventually. Monitoring should be conducted systematically for at least two nesting seasons. Hawksbill turtles do not nest each year, so a longer period should be considered for determining their use of Kalaupapa beaches.

Information on the number of adult females that nest each year and the survival of cohorts in the long term that return to the nest will be vital information obtained from the monitoring. Nesting success of the turtles will also be established. Determination of threats that limit sea turtle recovery on Kalaupapa beaches and mitigation of these threats can be accomplished. Involvement and training of Kalaupapa residents would be an integral part of the monitoring program.

6. Alternative Action/Solution and their Probable Impact: No action will result in a continuing lack of information on turtle habitat at Kalaupapa and will also result in poor management decisions with regards to the turtles.

7. Compliance: None needed.

8. Funding Requirements:

| | |
|---|---|
| Personnel (Salary & Benefits) (GS-7 0.2 FTE) | $4,600 |
| Volunteers | -0- |
| Supplies & Equipment (traps, tents, sleeping bags, etc.) | 2,000 |

| | |
|---|---|
| Total | $6,600 |

## PROJECT STATEMENT

1. Project Number: KALA-N-004

2. Project Title: Monitor and Manage Endangered Plants

3. Servicewide Issue: N03 - Impacts on Threatened, Endangered, and Other Plants

4. Problem Statement: There are at least nine endangered plant species known to occur within Kalaupapa National Historical Park: Achyranthes spendens var. rotundata, **Pritchardia munroi**?, Brighamia rockii, Cyanea procera, Canavalia molokaiensis, Panicum fauriei var carteri, Melicope reflexa, and Peucedanum sandwicense. Their habitats include the coastal strand vegetation, mesic forest, rainforest and cliffs. There are other plants that are found in habitats similar to Kalaupapa's, but have yet to be positively identified within the park's boundaries. The vascular plant inventory (Proj. No. N15) should aid in identifying all proposed and listed endangered and threatened species. In addition, extensive inventories of the park may reveal additional populations and species. The Endangered Species Act requires that endangered species occurring on federal lands be protected and negative impacts avoided. Maintaining these populations will require monitoring and management of threats.

5. Description of the Recommended Project: Monitor all known populations of endangered species and populations facing threats. Specifically, monitor all populations, annually during the wet season to be able to compare annual results to determine increasing or decreasing population trends. During the annual monitoring, data to be gathered includes number of individuals; number in various sizes and age classes; area covered; associated species and habitat; phenology and threats to plants including habitat alteration and browsing by ungulates, alien plants, rats, insects and disease.

   Management would be implemented for any population with immediate threats as per the requirements of the Endangered Species Act. Possible management options depending upon the affliction affecting the plants and the amount of plants being affected include fencing the habitat to protect from ungulates, controlling ungulates, removing alien plants and using appropriate methods to eradicate rats, insects and disease if they are proven to be destroying endangered and threatened plants.

6. Alternative Action/Solution and their Probable Impact: No action will result in populations becoming extirpated as threats continue to degrade their habitats.

   Only monitoring populations may result in populations still becoming extirpated while being monitored if threats are not controlled.

7. Compliance: Endangered Species Act, 1973.

8. Funding Requirements:

| | Monitor | Manage |
|---|---|---|
| Personnel Services (Biologist GS-9 0.3 FTE, 2 Biotechnicians GS-5 0.3 FTE) | $19,600 | $19,600 |
| Transportation | 2,000 | 4,000 |
| Supplies | 1,000 | 10,000 |
| Total | $22,600 | $33,600 |

## PROJECT STATEMENT

1. Project Number: KALA-I-005

2. Project Title: Revise General Management Plan (GMP)

3. Servicewide Issue: C01 - Inadequate Planning Documents

4. Problem Statement: The General Management Plan (GMP) for the park is outdated. It was written as a document for the incorporation of the area as a national historical park. It was not meant to be used to guide the park in its future management decisions. The GMP needs to be updated so it can be used as a guide to park management in the coming years.

5. Description of the Recommended Project: Revise the GMP. Park superintendent will work with the National Park Service's Western Region Office, Denver Service Center and/or a private contractor to develop and publish a new plan, which will then be used as a guide for park managers.

6. Alternative Action/Solution and their Probable Impact: No action will result in a lack of direction for the park. The future of the park will be based on the whims of managers rather than focused guidelines.

7. Compliance: None needed.

8. Funding Requirements:

| | |
|---|---|
| Contract | $200,000 |

## PROJECT STATEMENT

1. Project Number: KALA-C-006

2. Project Title: Implement Fire Protection Plan for St. Philomena & Siloama Churches

3. Servicewide Issue: C17 - Control of Environmental Impacts

4. Problem Statement: The Fire Protection Study for Kalaupapa's Historic Buildings (1992) outlined a plan to follow to protect the historic structures from fire using fire sprinkler and detection/alarm systems. The plan has yet to implemented. The plan includes providing structural support for buildings, installing sprinkler systems in the multi-occupancy buildings, and fire detection systems.

5. Description of the Recommended Project: Implement the plan's recommendations for the two buildings located in Kalawao. The remote location and historic importance of these buildings require advanced early detection systems. A preliminary design plan outlining the specific needs of the two buildings should be done by the Denver Service Center, then actual installation should be contracted out to a private contractor.

6. Alternative Action/Solution and their Probable Impact: Due to their remote location in Kalawao, without the warning systems, the detection and control of a fire would be based on chance and luck rather than skill.

7. Compliance: Refer to "Fire Protection Study for Historic Buildings at KNHP"

8. Funding Requirements:

| | Cost ($30/sq.ft.) |
|---|---|
| Provide Protection for | |
| St Philomena's Church (2,520 sq. ft.) | $75,600 |
| Siloama Church (800 sq. ft.) | 24,000 |
| Total | $99,600 |

## PROJECT STATEMENT

1. Project Number: KALA-C-007

2. Project Title: Establish Curatorial Cyclical Maintenance Program

3. Servicewide Issue: C03 - Incomplete Cataloging of Museum Collection (ANCS)
   C09 - Need for Collections Management Plans, etc.

4. Problem Statement: Although much has recently been done with the collection of objects and photographs at Kalaupapa, continuing work needs to be done on a cyclical basis. The existing collection has been accessioned but not completely cataloged. Patients and other members of the Kalaupapa community are continually donating items to the National Park Service now that the Service has shown it is capable of properly storing them. The curatorial efforts to date have decreased the existing backlog, but that effort has also created a new and continuing backlog. As the patient population decreases, the park must plan for increasing donations to the collection. In addition to processing donated items, the park must manage excavated artifacts to preserve them and make them available for study or display.

   The park has installed one Bally Box for protecting items from detrimental climatic conditions. However, this box is full. A permanent solution in the form of a climate-controlled building is needed for the expanding collection. A revised Collection Management Plan, Scope of Collection Statement and Exhibit Plan need to be developed to guide the collection of objects through the coming years.

5. Description of the Recommended Project: Hire a GS-9 Curator full-time to work on completing the cataloging of the existing collection, to adequately store and maintain the existing collection, and to accession and catalog new items that are being donated to the National Park Service. The curator will also do a condition assessment of different portions of the collection each year to identify any problems that need attention. He/She will also identify all additional storage needs. He/She will work on revising the various plans and guidelines related to the collection. He/She will work with the Arizona Memorial Association staff at the AJA Bookstore in Kalaupapa to properly exhibit objects in the collection for visitors' education and enjoyment.

6. Alternative Action/Solution and their Probable Impact: No action will result in a continuing backlog of unaccessioned and uncataloged items. The park manager will be unable to meet his mandates to properly care for the park's collection, and patients, sensing a lack of interest by the park, would stop donating items to the collection. The park could lose many valuable objects.

7. Compliance: None needed.

8. Funding Requirements:

| | |
|---|---|
| Personnel (Curator/Exhibit Specialist GS-9 1.0 FTE) | $28,000 |
| Supplies & Equipment | 6,000 |
| Travel & Per Diem | 2,000 |
| Total | $36,000 |

## PROJECT STATEMENT

1. Project Number: KALA-C-008

2. Project Title: Revise Collection Management Plan & Preservation Guide, Collection Storage Plan and Scope of Collection Statement

3. Servicewide Issue: C09 - Need for Collections Management Plans, etc.

4. Problem Statement: During the next five years, Kalaupapa National Historical Park has the opportunity to increase its historic collection. With wise forethought, planning and management, the park can continue to collect objects that paint a vivid picture of life in the Kalaupapa and Kalawao settlements. In addition, the collection can provide important information on historic structures, cultural landscapes and vegetation. Currently, there is a lack of direction with regards to the collection. Items are donated and ignored until a curator can be hired temporarily to record and properly preserve the objects. The Scope of Collection Statement is outdated and inadequate according to its author. The park needs this document to guide park managers in accepting donations. In addition, the only acceptable climate-controlled box is filled to its maximum capacity.

5. Description of the Recommended Project: Develop and prepare various collection guidelines including the Collection Management Plan and Preservation Guide, Collection Storage Plan and Scope of Collection Statement. These documents, revised and updated, will allow park managers to make informed decisions regarding the collection. To complete these documents, a full-time curator is necessary. The park's collection has the ability to grow, but this will only happen when residents see the proper attention being paid to their donations.

6. Alternative Action/Solution and their Probable Impact: No action will continue the current management practices, which result in improper storage for newly acquired items and confusion as to the guidelines for accepting and processing donations.

7. Compliance: None needed.

8. Funding Requirements:

| | |
|---|---|
| Personnel (Curator GS-9 1.0 FTE) | $27,800 |
| Supplies | 10,000 |
| Other (Travel & Per Diem) | 2,500 |
| Total | $40,300 |

## PROJECT STATEMENT

1. Project Number: KALA-C-009

2. Project Title: Review/Revise Priority & Treatment Recommendations List

3. Servicewide Issue: C07 - Inadequate Historic Structures Survey & Inventory

4. Problem Statement: There are currently some 195 historic structures included within the historic district. Many of these structures are purely operational in nature; some are privately owned; most are controlled by the State of Hawaii's Department of Health. Only 56 are listed on the park's List of Classified Structures (LCS). All, however, are identified as requiring some degree of preservation maintenance. Due to the inherent conflicts which arise between the needs of a living, evolving community and historic preservation standards, it is not reasonable, practically or politically, to expect that these structures will receive the treatments previously recommended (see Priority, Adaptive Use and Maintenance Responsibility of Buildings - Appendix E).

5. Description of the Recommended Project: Pare down the Resource Management Plan (RMP) Priority list to only those buildings which the park **really** wants to preserve. The remaining structures may still eventually be maintained by NPS as part of our co-operative agreement with the DOH, but will not require the level of funding or good will that is now necessary.

6. Alternative Action/Solution and their Probable Impact: No action will result in continued confusion as to which buildings the park should focus their preservation efforts.

7. Compliance: None needed.

8. Funding Requirements:

| | |
|---|---|
| Personnel (Historic architect GS-11-0.3 FTE) | $10,100 |
| Travel | 1,000 |
| Per Diem | 500 |
| Supplies | 500 |
| Total | $12,100 |

## PROJECT STATEMENT

1. Project Number: KALA-I-010

2. Project Title: Prepare Interpretive Prospectus

3. Servicewide Issue: C01 - Inadequate Planning Documents

4. Problem Statement: Kalaupapa National Historical Park contains many cultural and natural resources. The methods the park uses to educate and inform the public of the cultural and natural resources is outlined in the Interpretive Prospectus. The prospectus outlines the type of interpretation (way side signs, specific programs, etc.) and the goals of the program. It also mentions the limitations in using certain resources and protection needed for other resources. It details staff and funding needed to carry out the interpretive plan. It is used as an overall guide for interpretative responsibilities.

5. Description of the Recommended Project: Invite an interpretive specialist from the National Park Service to view Kalaupapa and discuss its current and future interpretive needs and the best methods to achieve its goals. Currently, Damien Tours, run by residents, provides tours of the peninsula. Their tour only touches on natural resources, cultural resources including archeology, and environmental education. The Park Service needs to develop a plan considering these other areas that Damien Tours does not focus on. The Interpretive Prospectus for Kalaupapa National Historical Park should consider the following issues: the exhibition and collection of objects; the personnel needs; the possible reconstruction of certain houses in Kalawao including Brother Dutton's house, Father Damien's house, the store, hospital, physician's quarters, and visitors quarters to be used for interpretation and education; the replacement of all Lions Club signs; the writing and publishing of guidebooks on the medical history of Hansen's Disease at Kalaupapa, archeology, geology, buildings, rare plants, medicinal plants, cemeteries/tombstones, birds, marine life, religions, Brother Dutton, nuns, craftsmanship, cookbooks, and songs; the construction and maintenance of traditional cultural gardens at Kalawao, Kalaupapa, and Makanalua; and possible restoration of Iliopii pond, Iliopii well, tombstones and heiaus around the peninsula.

6. Alternative Action/Solution and their Probable Impact: No action will result in the continuance of the current practices, which do not have an overall focus or direction.

7. Compliance: None needed.

8. Funding Requirements:

| | |
|---|---|
| Personnel (Interpretation Specialist GS-11 0.1 FTE) | $3,400 |
| Supplies | 100 |
| Other (Travel & Per Diem) | 200 |
| Total | $3,700 |

## PROJECT STATEMENT

1. Project Number: KALA-C-011

2. Project Title: Base Fund Preservation Maintenance Carpentry Crew

3. Servicewide Issue: C12 - Inadequate Preservation Maintenance Programs Including Stabilization and Cyclic Maintenance

4. Problem Statement: Currently, there is inadequate funding for building preservation maintenance. The everyday carpentry preservation maintenance is currently performed by the Department of Health (DOH) carpentry crew. As the patient population decreases and the Department of Health's budget is reduced, certain functions of the DOH are expected to become the National Park Service's responsibility including the carpenter's functions.

5. Description of the Recommended Project: Hire and train three preservation carpenters and three helpers to perform the day-to-day routine preservation maintenance. Establish a maintenance schedule with DOH.

6. Alternative Action/Solution and their Probable Impact: Continue to allow state DOH to perform tasks. There is always the risk that the state will expect the Park Service to take over the preservation maintenance before the park is ready to assume it. It may start to abandon buildings before the Park Service is equipped to maintain them. There could be an accelerated deterioration of buildings and improper treatment of problems.

7. Compliance: Memorandum of Agreement with State DOH.

8. Funding Requirements:

| | Year 1 |
|---|---|
| Personnel Services (3 @ WG-7-1.0 FTE, 3 @ WG-2-1.0 FTE) | $154,900 |
| Supplies | 80,000 |
| Other | 20,000 |
| Total | $254,900 |

## PROJECT STATEMENT

1. Project Number: KALA-C-012

2. Project Title: Base Fund Cyclic Building Projects

3. Servicewide Issue: C12 - Inadequate Preservation Maintenance Programs Including Stabilization and Cyclic Maintenance

4. Problem Statement: Inadequate service-wide funding of regular, cultural programs causes chronic backlog of cyclic projects. Essential projects such as exterior painting, reroofing and fumigation for termites typically are funded on a hit or miss basis causing advanced deterioration of the structures.

5. Description of the Recommended Project: Add base funding for cyclic building projects to ensure that essential cyclic programs are carried out.

6. Alternative Action/Solution and their Probable Impact: Continue to fund sporadically; continue to lose structures.

7. Compliance: IPP

8. Funding Requirements:

| | Year 1 |
|---|---|
| Base Funds (for Personnel, Supplies & Contractors) | $400,000 |

## PROJECT STATEMENT

1. Project Number: KALA-C-013

2. Project Title: Base Fund Building Restoration Crew

3. Servicewide Issue: C13 - Need for Rehabilitation or Restoration Of Historic and Prehistoric Structures and Cultural Landscapes

4. Problem Statement: Kalaupapa National Historical Park lacks positions and funding to establish building restoration crew. There are currently 56 structures on the park's List of Classified Structures (LCS) which receive no consistent funding for restoration. Since these structures are listed as historically significant, the park is required by law to preserve them.

5. Description of the Recommended Project: Hire and train two restoration carpenters and two helpers to provide for restoration of LCS structures. Hire one historic architect and one hands-on restoration exhibit specialist to plan and supervise the work.

6. Alternative Action/Solution and their Probable Impact: Without additional funding, there will be an accelerated deterioration of structures.

7. Compliance: MOA, Historic Structure Report

8. Funding Requirements:

| | Year 1 |
|---|---|
| Personnel (1 Historic Architect, 1 Restoration | |
| Exhibit Specialist both at 0.5 FTE) | $33,700 |
| (2 WG-7s at 1.0 FTE, 2 WG-2s at 1.0 FTE) | 103,300 |
| Supplies | 80,000 |
| Other | 15,000 |
| Total | $232,000 |

## PROJECT STATEMENT

1. Project Number: KALA-C-014

2. Project Title: Revise National Historic Landmark Nomination

3. Servicewide Issue: C08 - Need for Historic Resource Studies

4. Problem Statement: The current National Historic Landmark nomination includes all the buildings and area within the Kalaupapa settlement. For the resident patients, this restricts their freedom to add on to their house or build a garage or shed. For the park, this nomination requires it to actively preserve and maintain all the buildings within the settlement. Many of the buildings within the settlements are similar houses that have been built since the 1950s and have no true historic value. To preserve and maintain all of the buildings within the settlement requires funds which the park will never realistically have. There will always be buildings (private homes for the most part) not receiving maintenance treatment.

5. Description of the Recommended Project: The nomination needs to be revised to reflect the realistic goals of the park and the resident patients' rights to modify their homes. Once revised, the nomination should contain realistic preservation and maintenance goals, which the park will be able to achieve.

6. Alternative Action/Solution and their Probable Impact: No action will allow the current nomination to stand with its unrealistic goals.

7. Compliance: None needed.

8. Funding Requirements:

| | |
|---|---|
| Personnel (Resource Management Specialist GS-9 0.4 FTE) | $11,200 |
| Nomination Preparation | 500 |
| Other (Travel and Per Diem) | 2,500 |
| Total | $14,200 |

## PROJECT STATEMENT

1. Project Number: KALA-N-015

2. Project Title: Inventory Vascular Plants and Vegetation

3. Servicewide Issue: N20 - Lack of Basic Data

4. Problem Statement: The vegetation of Kalaupapa National Historical Park is not understood sufficiently for research, monitoring, and management purposes. Floristic surveys have been conducted for only three habitats: the coastal strand, the Kauhako Crater, and Pu`u Ali`i Plateau. Survey information is lacking for the rest of the park, including sea cliffs and stacks, remnant mesic forest, and montane cloud forest. An accurate knowledge of what native and alien plant species are present in each plant community is needed.

5. Description of the Recommended Project: A five step program is needed to accurately inventory the vascular plants found at Kalaupapa. First, conduct botanical exploration of the entire park, with collection of specimens for an on site reference collection and for "vouchers" in the Bishop Museum. Second, publish an annotated vascular plant checklist, giving general distributional, elevational and community information and Global Positioning Systems (GPS) locations for rare elements. Third, produce a vegetation map with a detailed description of each community mapped. Fourth, modify a "special ecological areas" (SEAs) list for future management focus. The fifth and last step is to develop a recommended design for a long-term vegetation monitoring program (Proj. No. N46).

6. Alternative Action/Solution and their Probable Impact: No action will result in a lack of base knowledge about the park's plants species. The park is required by law to protect federally endangered and threatened plants. Without a full inventory, status of federally endangered and threatened plants in the park is unknown.

7. Compliance: None needed.

8. Funding Requirements: Contract to National Biological Survey (NBS), The Nature Conservancy of Hawaii (TNCH), or University of Hawaii.

| | Year 1 | Year 2 |
|---|---|---|
| Personnel (Contract to an organization listed above) | $40,000 | $40,000 |

## PROJECT STATEMENT

1. Project Number: KALA-N-016

2. Project Title: Determine Status of Biological Life in Waikolu Stream

3. Servicewide Issue: N12 - Alteration of Natural Flow Regimes

4. Problem Statement: The status of biological life in Waikolu Stream is unknown. A variety of native species including the hihiwai (Neritina granosa), `opae `oeha`a (Macrobrachium grandimanus), and `o`opu alamo`o (Lentipes concolor) live in the stream. Human water consumption in the form of surface diversions and ground water wells may be threatening the native aquatic populations. It is unknown what the minimum instream flow standards are for a healthy aquatic population.

5. Description of the Recommended Project: Study and monitor the populations of `o`opu and hihiwai over a two year period recording size, location of the species, and habitat. Working with a hydrologist, determine fluctuations in the water levels and relate to population changes.

6. Alternative Action/Solution and their Probable Impact: No action will result in a continuing lack of information on the status of aquatic populations. Without this information, management decisions cannot be made to preserve the health of the stream.

7. Compliance: None needed.

8. Funding Requirements:

| | Year 1 | Year 2 |
|---|---|---|
| Personnel (Research Scientist GS-11 1.0 FTE, 2 Biotechnicians GS-5 1.5 FTE) | $61,200 | $61,200 |
| Helicopter Travel ($700/hr.) | 6,300 | 6,300 |
| Supplies | 15,000 | 10,000 |
| Report Preparation | -0- | 5,000 |
| Other (Travel & Per Diem) | 15,000 | 15,000 |
| Total | $97,500 | $97,500 |

## PROJECT STATEMENT

1. Project Number: KALA-I-017

2. Project Title: Develop an Urban Interface Fire Management Plan

3. Servicewide Issue: N07 - Disruption of Natural Fire Regimes
   C17 - Control of Environmental Impacts

4. Problem Statement: Structural and wild land fires are a threat to the park's natural and cultural resources (particularly historic structures, native and Polynesian plants, and possibly aquatic habitats through sudden release of nutrients). The invasion of lantana, Christmasberry, haole koa and alien grasses have created a fuel bed capable of carrying fire in some parts of the park. Fire will intensify with the 12-15 mph trade winds found on the peninsula, thereby increasing the threat of damage from future fires.

5. Description of the Recommended Project: An urban interface fire management plan will be prepared. This plan will characterize the fire environment, including fuels, fire behavior, fire effects, fire regimes, and external threats. It will also address hazardous fuels monitoring and possible reduction, fire prevention, and protection of valuable resources. The plan will also outline the procedures for controlling a structural and/or wild land fire on the peninsula.

6. Alternative Action/Solution and their Probable Impact: No action will result in no information on hazardous fuels composition and no guidelines for prevention and control of wild land and/or structural fires.

7. Compliance: NPS - 18, NPS - 58, NHPA.

8. Funding Requirements:

| | |
|---|---|
| Personnel (Fire Protection Specialist GS-11 0.2 FTE) | $6,800 |
| Travel | 1,000 |
| Per Diem ($150/Day) | 6,000 |
| Supplies | 500 |
| Total | $14,300 |

## PROJECT STATEMENT

1. Project Number: KALA-N-018

2. Project Title: Establish Monitoring and Experimental Non-Native Plant Removal Program in Coastal Strand (SEA)

3. Servicewide Issue: N04 - Degradation of Park Resources Due to Non-Native Animals

4. Problem Statement: The coastal strand vegetation of Kalaupapa is one of the best examples of this vegetation type in the state of Hawaii. The habitat contains at least one federally threatened plant species, Tetramolopium rockii var. rockii. Since the elimination of cattle on the peninsula, the vegetation appears to be surviving. However, expanding deer, goat, and pig populations are still possible threats to the ecosystem. In addition, invasive alien plants (lantana, Christmasberry) may present threats to the native plants.

5. Description of the Recommended Project: Management actions are based on determined needs. Information as to the status and healthiness of the coastal strand vegetation needs to be determined before any management action is taken. Permanent transects should be established to monitor changes in native and non-native plants. Experimental removal of non-native plants should be done in areas to determine which plants succeed it. If destruction by ungulates is observed, other management actions need to be considered.

6. Alternative Action/Solution and their Probable Impact: No action will result in the a lack of knowledge as to the threats to the native coastal strand vegetation.

   A second alternative is to fence the coastal area. The fence, exposed to the salt air, will corrode and rust out within five years. The fence will be 9 feet to keep deer out of the area. It will be an eyesore and an intrusion for people trying to enjoy the natural beauty of the coastline.

7. Compliance: 106 Section 7 consultation.

8. Funding Requirements:

| | |
|---|---|
| Personnel (Biologist GS-9 0.2 FTE, Biotechnician GS-5 0.2 FTE) | $9,300 |
| Supplies | 5,000 |
| Other (Travel & Per Diem) | 2,500 |
| Total | $16,800 |

## PROJECT STATEMENT

1. Project Number: KALA-N-019

2. Project Title: Inventory Water Rights, Uses, and Requirements for Waikolu Stream

3. Servicewide Issue: N12 - Alterations of Natural Flow Regimes

4. Problem Statement: No comprehensive inventory of water rights, uses, and requirements has been completed for Kalaupapa NHP. While the sole domestic water supply well has been registered with the State of Hawaii, no estimates of non-consumptive water uses and requirements have been made on a park-wide basis. Water supplies for non-consumptive purposes have already been infringed upon in Waikolu Valley, a perennial fresh-water stream. The State of Hawaii, Department of Agriculture (DOA), currently diverts 16.2 cfs from Waikolu surface and ground water sources. In 1989, park personnel noted for the first time that a 1/8 mile section of Waikolu was dried below the DOA surface diversions. Additional water withdrawals from the ground-water system may further deplete the base flow of Waikolu Stream and diminish the habitat for indigenous fish and crustaceans.

5. Description of the Recommended Project: With help from the NPS Water Resource Division in Fort Collins, CO, complete an inventory of water rights, uses and requirements. Future consumptive and non-consumptive water requirements will be quantified using existing archive information. Conduct studies to define hydrologic impacts caused by the diversions and to determine instream flow needs of selected aquatic species. Recommendations will be prepared on how best to use and protect water rights to fulfill Kalaupapa's management goals and objectives.

6. Alternative Action/Solution and their Probable Impact: No action will result in a continued lack of information on the effects of water withdrawal on the flora and fauna of Waikolu Stream. No action will also result in confusion and misinformation on water rights, uses and requirements.

7. Compliance: None needed.

8. Funding Requirements:

| | |
|---|---|
| Personnel (Hydrologist GS-11 0.3 FTE) | $10,100 |
| Travel & Per Diem | 3,800 |
| Supplies | 5,000 |
| Total | $18,900 |

## PROJECT STATEMENT

1. Project Number: KALA-I-020

2. Project Title: Develop Cave Management Plan

3. Servicewide Issue: N20 - Lack of Basic Data

4. Problem Statement: A number of caves have been identified over the years at Kalaupapa NHP. Most caves at Kalaupapa are lava tubes. Those near the coastal spray zone are most noticeable because of the generally short vegetation. Inland on the coastal terraces and upward within the vertical cliffs, heavy vegetation generally hides cave openings. Number and locations of caves on Kalaupapa are poorly known and documented.

   It is important to survey caves for baseline information on cultural, natural and historical resources present in them. Cave inventories will lead to information about possible resources that require special protection. Without such information, it is possible that natural or cultural resources will be altered or damaged.

5. Description of the Recommended Project: Conduct an inventory of the caves, then classify and map them. A systematic survey of Kalaupapa's caves will provide locations that can be mapped. A meeting with patients and others living in the area could help point out known caves. An inventory of the caves located where vegetation is dense and on steep slopes will be most time consuming.

   Completion of mapping should be followed by a classification of caves and inventories of their natural and cultural resources. Natural and cultural specialists will review inventory data, visit selected caves with special or sensitive resources and make recommendations as to the future management options. A final product will be development of a cave management plan. The cave management plan should contain information about monitoring the resources and training park personnel to conduct the monitoring.

   The first part of the project involves locating and mapping caves. The second phase is a search for historical, archeological, faunal and floral resources in the caves. Biological specimens will be sent to appropriate specialists for taxonomic identifications. Based on findings and recommendations, professionals familiar with speleology will prepare a cave management plan for Kalaupapa.

6. Alternative Action/Solution and their Probable Impact: No action will result in a continued lack of information on location and status of resources in caves. Only one study has been published on caves at Kalaupapa (Bishop Museum, University of Hawaii, 1978). Without more information and a plan to manage the caves, management decisions cannot be

made.

7. Compliance: Section 106 NHPA. Since the project could involve cutting native vegetation, compliance with the National Environmental Policy Act (NEPA) may be required. This, however, is only a remote possibility.

8. Funding Requirements:

| | Year 1 | Year 2 |
|---|---|---|
| Locate and map caves | $5,000 | -0- |
| Conduct biological, historical, and archeological inventories within caves (including taxonomic identifications) | -0- | $27,000 |
| Prepare Kalaupapa Cave Management Plan | -0- | 3,000 |
| Total | $5,000 | $30,000 |

## PROJECT STATEMENT

1. Project Number: KALA-C-021

2. Project Title: Conduct Archival Research for Pre-1866 Kalaupapa

3. Servicewide Issue: C08 - Need for Historic Resource Studies & Administrative Histories

4. Problem Statement: When the Historic Resource Study was done in 1985, the author concentrated almost exclusively on the post-1866 Hansen's Disease period of Kalaupapa's history. The pre-1866 historic period was only briefly discussed and most of the discussion relied on secondary sources. There was a sizeable Hawaiian population at Kalaupapa prior to the establishment of the Hansen's Disease settlement in 1866. In addition to that period, those same records need to be researched for Kalaupapa ahupua`a (land divisions) up until about 1900, because remnants of that Hawaiian population continued to live in Kalaupapa ahupua`a until then. There were interrelationships between that population and the Hansen's Disease population from 1866 until at least 1900 that are poorly documented and understood.

5. Description of the Recommended Project: Conduct necessary archival research to document the pre-1866 history of Kalaupapa National Historical Park. To the extent possible, the work will be with primary sources and will be concentrated primarily in Honolulu where research facilities such as the State of Hawaii Archives and the Bishop Museum are located. The final result will be a report that will be published in either the WACC Publications in Anthropology series or the CPSU's publications series. This project would also provide information on the status of flora and fauna on the peninsula through historical accounts.

6. Alternative Action/Solution and their Probable Impact: No action would maintain the status quo. The pre-1866 history of Kalaupapa would remain largely unknown.

7. Compliance: None needed.

8. Funding Requirements:

| | |
|---|---|
| Personnel (Researcher GS-09 0.5 FTE) | $14,000 |
| Document Duplication | 3,000 |
| Supplies | 1,000 |
| Other (Travel and Per Diem) | 500 |
| Total | $18,500 |

## PROJECT STATEMENT

1. Project Number: KALA-C-022

2. Project Title: Conduct Archeological Survey of Waikolu Valley

3. Servicewide Issue: C02 - Inadequate Archeological Survey and Inventory

4. Problem Statement: Waikolu Valley was one of the best on the island of Moloka`i suited for growing wet land taro. Abundant evidence of taro growing by the Hawaiians in prehistoric and historic times exists in the valley in the form of terraces, irrigation ditches, house sites and religious structures. To date, no systematic archeological survey has been conducted in the valley. In the absence of such a survey, park managers are being required to manage a resource about which they have little to no information.

5. Description of the Recommended Project: An archeological survey of the valley will be conducted. The valley will be divided into two parts for the survey because of the nature of access to the valley. The lower valley will be surveyed starting from the mouth of the valley. Access, for people and supplies, will be by boat from the peninsula. The upper valley access will be by the water tunnel that leads to topside Moloka`i from Waikolu Valley. All identified cultural resources within the valley will be recorded and mapped in detail. After the field work has been completed, the archeologist will analyze the data and write a final report that will be published in the WACC Publications in Anthropology series. This survey would supplement the natural resources aquatic inventory being done there currently (Proj. No. N16) to provide a comprehensive picture of natural and cultural resources in Waikolu Valley.

6. Alternative Action/Solution and their Probable Impact: No action would result in park managers continuing to manage the area based on little or no knowledge of what was present.

7. Compliance: NHPA.

8. Funding Requirements:

| | Year 1 | Year 2 | Year 3 |
|---|---|---|---|
| Personnel (Archeologist GS-11 1.0 FTE, 3 Arch. Assistants GS-5 0.3 FTE) | $50,300 | $50,300 | $50,300 |
| Supplies | 3,000 | 3,000 | 3,000 |
| Report Preparation/Publication | 5,000 | 5,000 | 5,000 |
| Other (Travel & Per Diem) | 3,000 | 3,000 | 3,000 |
| Total | $61,300 | $61,300 | $61,300 |

## PROJECT STATEMENT

1. Project Number: KALA-C-023

2. Project Title: Prepare Ethnographic Overview & Assessment Report

3. Servicewide Issue: C04 - Need for Ethnographic Overviews & Assessments

4. Problem Statement: Seven previous oral history projects have collected much information from the Hansen's Disease patients and others at Kalaupapa. However, more work needs to be done. When the Hansen's Disease settlement was established at Kalawao, the resident Hawaiian population continued to live on the Kalaupapa side of the peninsula until almost 1900. No study has ever been done to determine the traditions and land management practices of that population and its descendants.

5. Description of the Recommended Project: Contract with a qualified ethnographer to prepare an ethnographic overview and assessment to determine the nature and extent of this displaced population and its relationship with the park area, both historically and at present. The document will provide the context for developing specialized ethnographic studies, identify and help protect intangible cultural resources, and develop informed and culturally sensitive working relationships with Native Hawaiian groups. The document will also identify any natural or cultural resources where use by Native Hawaiians may be in conflict with the NPS mandate to preserve and protect the resources.

This project and Conduct Archival Research for Pre-1866 Kalaupapa (Proj. No. C21) are directly related to one anther. This project should not be undertaken until Proj. No.C21 has been completed.

6. Alternative Action/Solution and their Probable Impact: None.

7. Compliance: None needed.

8. Funding Requirements:

| | |
|---|---|
| Personnel (Ethnographer GS-11 1.0 FTE) | $33,700 |
| Supplies | 2,000 |
| Report Preparation/Publication | 2,500 |
| Other (Travel and Per Diem) | 5,300 |
| Total | $43,500 |

## PROJECT STATEMENT

1. Project Number: KALA-C-024

2. Project Title: Prepare Cultural Landscape Inventory and Report

3. Servicewide Issue: C11 - Need for a Cultural Landscape Report

4. Problem Statement: Throughout the history of the Kalaupapa and Kalawao settlements and the history of the peninsula, the cultural landscapes have played an integral part in the functioning of the settlements. There were victory gardens during WWII, medicinal gardens, agricultural plots across the peninsula, gardens of ornamentals, and areas planted and maintained by early Hawaiians with Polynesian plants. The cultural landscapes necessary in the past are an important part of the interpretation of the settlement in the future. Without research and documentation of the landscapes of the past, the future may be just mowed lawns and invasive weeds.

5. Description of the Recommended Project: Prepare a Cultural Landscape Inventory and Report documenting the remaining cultural landscapes and historic landscapes from different time periods and places. Vegetation and cultural resources specialists will work together to map gardens in the settlement. In writing their report, they will include historic photographs of cultural landscapes juxtaposed with current photographs of the same area. This document will guide future interpretation and maintenance functions.

6. Alternative Action/Solution and their Probable Impact: No action will result in the loss of a tool of interpretation and piece of history.

7. Compliance: None needed.

8. Funding Requirements:

| | |
|---|---|
| Personnel (Cultural Resources Specialist GS-11 0.2 FTE, Vegetation Specialist GS-11 0.1 FTE) | $10,200 |
| Supplies | 1,500 |
| Report Preparation/Publication | 2,000 |
| Other (Travel and Per Diem) | 1,500 |
| Total | $15,200 |

## PROJECT STATEMENT

1. Project Number: KALA-C-025

2. Project Title: Develop Alien Plant Control Plan for Preservation of Archeological Sites

3. Servicewide Issue: C17 - Control of Environmental Impacts

4. Problem Statement: Non-native, invasive plants cover most of the Kalaupapa peninsula. These plants threaten the archeological sites that are scattered throughout the peninsula. The roots of the plants upset and destroy stone structures. The haole koa and Christmasberry form a dense bush making it virtually impossible to reach the archeological sites and/or locate them from the air.

5. Description of the Recommended Project: Work with archaeologists, botanists and others trained in alien plant control methods to develop, and later implement, an alien plant control plan, which will outline the sites to be treated and methods to be used.

6. Alternative Action/Solution and their Probable Impact: No action will result in the loss of archeological sites on the peninsula. Non-native plants will cover and destroy the archeological sites found on the peninsula.

   Without the plan, alien plant removal may still occur by volunteers and the archeologist, but it would be unsystematic and without guiding priorities.

7. Compliance: None needed.

8. Funding Requirements:

| | |
|---|---|
| Personnel (Archeologist GS-11 0.1 FTE, Vegetation Specialist GS-9 0.1 FTE) | $6,200 |
| Supplies | 500 |
| Other (Travel and Per Diem) | 1,000 |
| Total | $7,700 |

## PROJECT STATEMENT

1. Project Number: KALA-N-026

2. Project Title: Monitor Remote Area Weather System (RAWS) Data

3. Servicewide Issue: N20 - Lack of Basic Data

4. Problem Statement: In 1993, three Remote Area Weather Systems (RAWS) were installed in Kalaupapa National Historical Park. These stations, located at three elevations in the park, provide necessary data on precipitation, climate, and chemistry of the atmosphere in the park. The data from these instruments is being sent by satellite to Idaho, where it is stored. The park needs to develop a consistent system to retrieve this data and store it on site to be referenced as necessary.

5. Description of the Recommended Project: Work with NPS Fire Management Office in Boise, Idaho to develop method of data retrieval and storage at Kalaupapa. Use initial data as baseline information to allow for comparisons in coming years.

6. Alternative Action/Solution and their Probable Impact: No action will result in park not having data accessible to meet its needs.

7. Compliance: None needed.

8. Funding Requirements:

| | |
|---|---|
| Personnel (Biotechnician GS-5 0.1 FTE) | $1,900 |
| Supplies | 100 |
| Total | $2,000 |

## PROJECT STATEMENT

1. Project Number: KALA-I-027

2. Project Title: Research and Control Hazardous Fuels

3. Servicewide Issue: C20 - Inadequate Security (from Fire)
N07 - Disruption of Natural Fire Regimes

4. Problem Statement: Dense populations of alien plants cover most of the peninsula. The burn behavior of these plants individually and as a group is not known. In order to develop an effective fire management plan (Proj. No. I17), more information is necessary on the alien plant species and their behavior during fires.

5. Description of the Recommended Project: Work with the National Park Service's Fire Management Office in Boise, Idaho to research the hazardous fuel bed. Determine how the native and non-native plants will burn and learn the probable plants that will be first to return after a fire. Propose recommendations to manage the hazardous fuel bed.

6. Alternative Action/Solution and their Probable Impact: No action will result in no knowledge regarding the burn behavior of the plants on the peninsula. This lack of knowledge will seriously impair fire control efforts in the event of a fire.

7. Compliance: None needed.

8. Funding Requirements:

| | |
|---|---|
| Personnel (Fire Specialist GS-11 0.2 FTE) | $6,800 |
| Supplies | 500 |
| Other (Travel and Per Diem) | 1,500 |
| Total | $8,800 |

## PROJECT STATEMENT

1. Project Number: KALA-N-028

2. Project Title: Research and Consolidate Information on Park's Avifauna

3. Servicewide Issue: N20 - Lack of Basic Data

4. Problem Statement: Kalaupapa is an important habitat for several native forest birds including the federally endangered Moloka`i creeper (Paroreomyza flammea), Newell's shearwater, nooty tern, apap`ane, and other non-native birds. The avifauna is a major component of the park's natural resource base. While considerable information exists on the historical and present distribution and status of these species, it is widely scattered and generally inaccessible to park managers. This information is critical to understanding the historical dynamics of the park's natural history and as background for future monitoring and recovery efforts. A clear understanding of existing information is also needed to guide additional survey and research efforts in order to make the best use of available time and money.

5. Description of the Recommended Project: The park will contract through CPSU to compile existing information from museum collections, surveys, field notes, etc., into a single updatable report on the avifauna of Kalaupapa. Species ranges will be mapped as part of the report, which will also be cross-referenced to the sources of all information. The entire report should be prepared in a form that can be used directly be park managers and housed at the park. It should be prepared in a method compatible with the Data Management Plan (Proj. No. N60).

   This work will provide park managers and researchers with valuable background for management of a poorly understood component of Kalaupapa.

6. Alternative Action/Solution and their Probable Impact: No action will result in poor management decisions regarding the park's avifaunal resources or will result in a waste of time and money on redundant studies.

7. Compliance: None needed.

8. Funding Requirements:

| | |
|---|---|
| Contract to CPSU | $15,000 |

## PROJECT STATEMENT

1. Project Number: KALA-N-029

2. Project Title: Inventory Marine Reef for Aquatic Life

3. Servicewide Issue: N20 - Lack of Basic Data

4. Problem Statement: Kalaupapa National Historical Park's boundary extends for a quarter-mile offshore. Within this quarter-mile, a significant amount of marine reef offers habitat for a variety of aquatic life. Knowledge of the identity and status of marine resources in the park is extremely limited. Previous studies have been few and limited in scope. There is not adequate information on the marine biota to assess how it relates to other coastal environments (relative conditions of resources, uniqueness) or to determine the presence or location of resources in order to plan appropriate protection. The remoteness of the park area and restrictions against land access have historically provided strong protection against over-exploitation and abuse of coastal and nearshore biota. Much of the adjacent marine resources base is in nearly pristine condition. It is desirable to maintain such conditions. This will require protective regulations, which can be best supported with good descriptive data on the nearshore marine environments and resources. Such information will also make it possible to plan specific management measures related to marine features affecting interpretation, visitor safety, and protection of sensitive species (threatened and endangered). Specific threats, conflicts, problems, and opportunities can be identified and planned for, once the marine environment and resources are inventoried and assessed.

5. Description of the Recommended Project: A study will be conducted to provide a general qualitative description of all prominent nearshore marine habitats, list of common species/types of the macrobiota, and, where feasible, semi-quantitative estimates or indices of their abundance and rough assessment of their relationships to the habitats. All available literature (very limited) should be reviewed and appropriate oral information collected. Appropriate areas (transects, stations, etc.), representative of all apparent environments along the full length of the park shoreline, will receive field studies as follows:

a. Shoreline observations of intertidal substratums (beaches, rock slopes, tide pools, shore cliffs). An initial reconnaissance has been made of the algal flora. Follow-up studies are required to complete the assessment, working both by walking along the shore and snorkeling or scuba observations. A species list and general impression of occurrence of shoreline animals in the intertidal will be obtained similarly.

b. Subtidal observations of large sample areas using snorkel and scuba will extend the coverage of habitat from the shoreline observations out to depths equalling 130 feet (extent to be determined by bathymetry and nature of the substrata and habitat). These systematic observations will provide the best visual taxonomic identifications feasible, along with rough

estimates of abundance and notes on behavior and habitat associations. Where appropriate specimens will be collected for later identification. Fin fish and corals will be the groups most readily and commonly observed, but other macrobiota will be reported wherever visible.

c. Observations and records will be made as available of more rare or transient animals: e.g. turtles, whales, wide-ranging pelagic fish species. Special attention will be paid to their occurrence (especially turtles) and any apparent habitat associations will be reported. The distribution, abundance, and movements of these animals do not permit secured surveys for semi-quantitative assessments within a feasible level of effort.

Field observations and local information will be collected to broadly describe the nature and intensity of current fishing activity. The research scientist will develop appropriate monitoring protocols and then train appropriate park staff in the implementation of the protocol for further use.

A study similar to that done for the marine resource of Kaloko-Honokohau National Historical Park seems appropriate. The report of that study can be consulted for details.

The project is relevant to marine water quality assessment (Proj. No.10) because of possible correlations between occurrence of pollutants and either (a) changes in the marine flora or fauna, or (b) presence of edible resources which may present a health concern. It is unlikely that a casual relationship can be firmly established, even if high levels of pollution are found, but certain correlations might lead to prudent management decisions.

6. Alternative Action/Solution and their Probable Impact: Without the inventory and assessment, the marine resources remain an unknown and unmanageable resource.

7. Compliance: None needed.

8. Funding Requirements:

| | |
|---|---|
| Personnel (Research Biologist GS-12 0.1 FTE, Aquatic Specialist GS-9 0.2 FTE) | $10,000 |
| Travel and Per Diem | 4,000 |
| Supplies | 3,000 |
| Total | $17,000 |

## PROJECT STATEMENT

1. Project Number: KALA-N-030

2. Project Title: Inventory Kauhako Trench/Lava Tube (SEA)

3. Servicewide Issue: N04 - Degradation of Park Resources Due to Non-Native Animals

4. Problem Statement: Kauhako Trench is a lava tube running north from Kauhako Crater. Several portions have collapsed allowing vegetation to become established in an environment protected from wind and ocean spray as well as browsing and trampling by cattle, deer and pigs. Several of these depressions contain pockets of native plants: trees, such as wiliwili and `ohe, which probably represent vestiges of the native forest that once covered the peninsula. This area represents a unique resource in the park, due to the remnant forest and is a special ecological area (SEA-See page 21). A complete inventory needs to be done to determine the extent of the native vegetation in the trench. After the inventory, which will include a description of threats to the area and extent of damage to native species, management options need to be developed to protect the area from disturbances including feral animals and alien, invasive plants. A monitoring system for the trench will also need to be developed and appropriate park staff trained in the implementation of the monitoring protocol.

5. Description of the Recommended Project: Map Kauhako Trench from Pu`u `Uao to Kapapakikane, which is a mile and a half in length. The technical report will include a list of species present so that the presence/absence of species can be correlated with physical characteristics of the collapsed tube, including, but not limited to area, depth, and ease of access. Develop permanent transects for future monitoring of the SEA and use the approved photo-point method to record specific areas (See Project No. N38 and No. N46). There will be only minor impacts on the ecosystems. A few plants will be collected for identification, verification, or voucher specimens. A few herbaceous plants may be trampled.

6. Alternative Action/Solution and their Probable Impact: No action may result in vestige stands of native plants remaining isolated in certain areas of the trench system, but they also may disappear due to action by pigs, rats, etc. It will be difficult to make management decisions.

7. Compliance: None needed.

8. Funding Requirements:

| | |
|---|---|
| Personnel (Vegetation Specialist GS-9 0.1 FTE, 2 Biotechnicians GS-5 0.1 FTE) | $6,500 |
| Supplies (Flagging t | |
| Other (Travel & Per Diem) | 3,400 |
| Total | $10,400 |

## PROJECT STATEMENT

1. Project Number: KALA-C-031

2. Project Title: Conduct Inventory and Condition Assessment Program (ICAP)

3. Servicewide Issue: CO1 - Inadequate Planning Documents

4. Problem Statement: No structures have been inventoried using the relatively new service-wide Inventory Condition and Assessment Program (ICAP) format. It appears that this computerized inventory format will be an essential planning document for all future funding requests for maintenance. This is an extremely time consuming process that will require a substantial commitment of funding and personnel. The park currently lacks both.

5. Description of the Recommended Project: Contract with the Cooperative Parks Studies Unit (CPSU), A & E, or other professional group to inventory and enter data on all structures which may require federal maintenance funds in the future.

6. Alternative Action/Solution and their Probable Impact: No action will result in continued negligence in preparing the park to apply for and successfully receive maintenance funding requests.

7. Compliance: IPP

8. Funding Requirements:

| | |
|---|---|
| Contract | $800,000 |

**PROJECT STATEMENT**

1. Project Number: KALA-C-032

2. Project Title: Conduct Aerial Archeological Survey of Kalaupapa

3. Servicewide Issue: C02 - Inadequate Archeological Survey

4. Problem Statement: Only 333 acres of Kalaupapa NHP have been intensively surveyed for archeological resources. The density of the vegetation and the number of archeological resources make standard on-the-ground archeological surveys very slow and expensive. Although the dense vegetation also reduces the usefulness of aerial photography over much of the park, portions of the peninsula are covered only with low vegetation and many archeological features are visible in those areas.

5. Description of the Recommended Project: Photographs of the park have been taken and currently they and existing imagery are being carefully studied by an archeologist familiar with both the resource base and the use of aerial photographs. Currently, the archeologist is identifying, locating and plotting archeological features onto orthophoto quads and topographic quads. After that work has been completed, the archeologist and a crew of two assistants will conduct field work to both check and record features identified on the photographs and to prepare detailed maps of those sites that warrant further work. A final report of publishable quality will be prepared describing and discussing the results of the project and making recommendations for future work.

6. Alternative Action/Solution and their Probable Impact: No action will result in no new information, and the park manager will continue to make management decisions based on little knowledge.

   Conduct a complete on-the-ground intensive survey. This action will result in a more complete and thorough job than the use of aerial photographs with limited field work will. It will also cost 5 to 10 times as much as the aerial survey approach. It will also entail the cutting of much more vegetation. Although the vegetation on the peninsula is predominately alien, there are isolated pockets of native species that could be inadvertently impacted by cutting.

7. Compliance: None needed.

8. Funding Requirements:

| | |
|---|---|
| Personnel (Archeologist GS-11 0.2 FTE, Technical Illustrator GS-7 0.2 FTE) | $11,400 |
| Supplies | 500 |
| Report Preparation/Publication | 2,000 |
| Other (Travel and Per Diem) | 1,000 |

| | |
|---|---|
| Total | $17,700 |

## PROJECT STATEMENT

1. Project Number: KALA-C-033

2. Project Title: Compile Inventory of Historic and Scientific Materials Stored at Kalaupapa, Bishop Museum and Elsewhere

3. Servicewide Issue: C26 - Other
   N20 - Lack of Basic Data

4. Problem Statement: Since its inception fourteen years ago, Kalaupapa National Historical Park has completed some natural and cultural resource projects. The information generated by these reports is in danger of being forgotten and/or repeated as park managers and staff change. In addition, there is information on Kalaupapa's historic natural and cultural resources in Bishop Museum and elsewhere that could be beneficial to resource managers here in the park. An inventory, available to researchers and visitors, needs to be compiled of all historic and scientific information obtained and published on Kalaupapa over the years.

5. Description of the Recommended Project: Obtain information on Kalaupapa from Honolulu's Bishop Museum and State of Hawaii Archives. This project can be completed in conjunction with the Archival Research for Pre-1866 Kalaupapa (Proj. No. C21) and should build on any information collected during that project. In addition to archival research, a comprehensive list should be generated containing all the publications done by the National Park Service on Kalaupapa. A final list of reports should contain author, title, and general subject material and location(s) of item.

6. Alternative Action/Solution and their Probable Impact: No action will result in a continuing scattered knowledge about the historic and scientific knowledge of Kalaupapa. Research could be repeated and money wasted.

7. Compliance: None needed.

8. Funding Requirements:

| | |
|---|---|
| Personnel (Research Assistant GS-5 0.5 FTE) | $9,200 |
| Supplies | 500 |
| Report Preparation/Publication | 1,000 |
| Other (Travel and Per Diem) | 1,000 |
| Total | $11,700 |

## PROJECT STATEMENT

1. Project Number: KALA-I-034

2. Project Title: Conduct a Study of Vegetational History and Changes at Kalaupapa

3. Servicewide Issue: N08 - Loss of Cultural Landscapes
   N20 - Lack of Basic Data

4. Problem Statement: Throughout the history of human habitation on the Kalaupapa peninsula, there have been a variety of vegetation changes. At one point, the peninsula was virtually treeless and used for growing sweet potatoes. There was also agricultural plots in Kauhako Crater and in the valleys. During one period, cattle roamed freely over most of the peninsula. With the exclusion of cattle in the 1980s, there has been another change in vegetation. The alien, invasive weeds (Christmasberry, haole koa, lantana) have made major inroads on the peninsula. At least 50% of the peninsula is now covered by Christmasberry.

5. Description of the Recommended Project: Do archival research to determine the type of vegetation here during different periods of human habitation. Look at old photos then visit sites to re-photograph area and document changes in vegetation type. Talk with resident patients about the changes they have heard of and/or witnessed. Use soil analysis from water line project to further document changes in vegetation. Report should include time periods and vegetation types, major changes in vegetation and their occurrence, listing of sources, and information as to possible native plant reintroductions and suggestions for non-native plant removal.

6. Alternative Action/Solution and their Probable Impact: No action will result in a lack of knowledge about historic vegetation on the peninsula.

7. Compliance: None needed.

8. Funding Requirements:

| | |
|---|---|
| Personnel (Research Assistant GS-5 0.2 FTE) | $3,600 |
| Supplies | 1,000 |
| Other (Travel & Per Diem) | 2,000 |
| Total | $6,600 |

## PROJECT STATEMENT

1. Project Number: KALA-N-035

2. Project Title: Monitor & Control Non-Native Animals Around Settlement

3. Servicewide Issue: N04 - Degradation of Park Resources Due to Non-Native Animals

4. Problem Statement: The Kalaupapa settlement is the source of newly introduced alien animals, which are a threat to the remainder of the peninsula. The possible threats include ants and lizards. The settlement also provides easy access to food for feral cats, dogs, mongoose, and pigs. There is a need to establish a buffer zone between the settlement and natural areas of the park to evaluate and manage feral animals.

5. Description of the Recommended Project: To protect the peninsula from feral animals originating in the settlement, there are two areas to focus on: the area around the settlement and the town dump. Around the settlement, maintain the fence already constructed around the area, clear a wider fire break (two more lanes) around the fence and conduct a regular patrol around the fence to monitor and control animals. Veterinary services should also be available to spay and neuter the semi-feral cat population.

   The garbage disposal area also provides easy access to food for the feral animals. To start controlling access to this area, the first step would be a fence around the disposal area to control access by feral pigs. The next step would be to decide management practices to control the smaller feral animal populations including the rats and mongooses.

6. Alternative Action/Solution and their Probable Impact: No action would result in a continually increasing population of feral animals and the increasing populations of feral animals on the peninsula disturbing and destroying native habitats.

7. Compliance: 106.

8. Funding Requirements:

| | |
|---|---|
| Personnel Services (Park Ranger GS-9 0.1 FTE) for Monitoring & Control | $2,800 |
| Clearing | 10,000 |
| Support Costs | 1,000 |
| Fence Garbage Area Against Pigs & Mongooses (200 yds. at $5.00/yd) | 1,000 |
| Total | $14,800 |

## PROJECT STATEMENT

1. Project Number: KALA-N-036

2. Project Title: Inventory and Monitor Ungulates Within Park Boundaries

3. Servicewide Issue: N20 - Lack of Basic Data

4. Problem Statement: The national park needs to collect baseline data on a number of feral and non-native animals. Once data is collected, informed management decisions can be made as to how to control and/or manage the feral and wild mammals found in the park. The species targeted for inventories and surveys include feral pigs, feral goats, axis deer and horses. After inventory results are finalized, management decisions can be made based on the impact of ungulates on remnant native vegetation, archeological sites, erosion, possible accelerated sedimentation of near shore reefs or Kauhako Lake. Once management decisions have been made, monitoring programs should continue to measure the success of any programs.

5. Description of the Recommended Project: Before any management decisions can be made, data needs to be collected. Information on species, distribution, and abundance is most important in managing the land and its inhabitants. Information on feral pigs, goats, and horses as well as axis deer is needed. A damage assessment should also be done in disturbed areas. To determine species, distribution, and abundance, a combination of two methods is recommended to get a full understanding of the populations. One method involves linear transects counting actual bodies and/or counting indirect signs of animal presence including tracks, trails, droppings, rubbings, yardings, etc. In addition, to verify population and location estimates, a Forward-Looking Infrared Video Camera system is recommended, which involves flying a helicopter over the peninsula in the early morning and using an infrared camera to record the heat-radiating bodies on the ground below.

6. Alternative Action/Solution and their Probable Impact: No action will result in a lack of information on which to base sensitive and important resource management decisions which affect all aspects of the park.

   Using one of the two alternatives mentioned above will result in helpful information, but will not be as accurate as using both of the suggested methods.

   A third alternative is to mark locations along the roads throughout the peninsula. Return to those locations at night and record the number of animals seen when using a spotlight.

7. Compliance: None needed.

8. Funding Requirements:

| | |
|---|---|
| Personnel ( Wildlife Biologist GS-9 0.1 FTE, Biotechnician GS-5 0.2 FTE) | $6,500 |
| Helicopter Rental $700/hr. X 8 hrs. (2 flights) | 5,600 |
| Equipment | 1,000 |
| Supplies | 400 |
| Travel | 400 |
| Per Diem | 1,400 |
| Total | $15,300 |

## PROJECT STATEMENT

1. Project Number: KALA-N-037

2. Project Title: Evaluate Nearshore Marine Water Quality

3. Servicewide Issue: N20 - Lack of Basic Data

4. Problem Statement: In portions of the park more remote from human activities, water quality is not a major concern. However, all domestic waste water, including sewage, is dispersed by cesspools or septic systems. Most human habitation is close to shore, there is little soil, the rock structure is generally porous, and lava tubes occur. High nutrient loads and human pathogens may reach shore waters locally, especially around the concentrated habitation area of Kalaupapa settlement and immediately adjacent to dumps/landfills located close to shore. The total source of effluent is not large, and the normally strong mixing processes of coastal waters probably dilute contaminants to acceptable levels not far offshore. However, it is not clear whether concentrations close to shore may present a water quality problem. It is not known if any data exists at present. Since this inshore area is one of great interest in park planning in terms of human health, contact use, and quality of natural environment, knowledge of present levels and distribution of key contaminants is needed for park planning and management.

5. Description of the Recommended Project: The study will first determine whether problem levels of contaminants can be detected in waters close to shore. If such contaminants occur, their general spatial distribution will be mapped and correlated in a broad way with the apparent local coastal water circulation patterns.

   Initial analysis will be done with samples at what seem to be prime areas near likely contamination input sites including known strong freshwater flows into the intertidal area near the middle of the settlement, intertidal waters immediately off the main landfill near Kalaupapa beach. A few other samples close in to the more populated area (all on the southwest portion of the peninsula) will also be analyzed for comparison. If acceptably low levels of contaminants are found at times of high potential, the study will be terminated. If high levels are found, a larger grid of sample stations will be analyzed to detect a general pattern of concentrations and begin a temporal base line. Crude water circulation studies will be made in the immediate vicinity of high contaminant areas to provide some general prediction of the path of contaminated water masses close inshore. There, studies will involve tracking simple drifters or dye releases or similar low cost methods for relatively short distances. The expected product is a rough spatial map of contaminant concentrations in near-shore waters with rough track of water movements that may correlate with the contaminants.

   Observations at the shoreline and inshore waters of algal and benthic invertebrate

communities may provide evidence of unusual nutrient loads. The total project may permit identifying the major contaminant sources, and thereby facilitate management decisions.

The marine resource inventory project (Proj. No. N29) is closely related, since it provides information on plants and animals potentially affected.

6. Alternative Action/Solution and their Probable Impact: No action will result in continued complete lack of information on health and other potential contamination problems.

7. Compliance: None needed.

8. Funding Requirements:

| | |
|---|---|
| Samples/Analysis (Contract to CPSU) | $5,000 |

## PROJECT STATEMENT

1. Project Number: KALA-N-038

2. Project Title: Acquire and Compile Comprehensive Photographic Documentation

3. Servicewide Issue: N20 - Lack of Basic Data

4. Problem Statement: Kalaupapa lacks a scientifically based compilation and ongoing acquisition of aerial and land photographs needed for baseline information. Thus, a basic tool for managing the park's resources is lacking.

   Aerial photos are an invaluable tool when conducting inventories and mapping occurrences and distributions. One set needs to be taken with sequential sets taken at regular frequencies in the future. The value of the frequency will be apparent in following years when comparisons are made. The closer the frequency, the more useful the information. Changes and trends can be monitored in conjunction with analysis (ground truthing) in the field.

   Kalaupapa also requires a photo-point monitoring system to augment the quantitative resource monitoring efforts. The photo points should be set up as part of the long term monitoring plans for the Special Ecological Areas (SEAs) of the park and other cultural resource sites. Dramatic changes are occurring in plant communities at Kalaupapa resulting from activities of feral animals, invasions of alien plants and other disturbances. Photographs illustrating vegetation changes are available for certain areas in private collections, museums and park files. However, a scientifically based collection is lacking in addition to a plan for the present collection and future photographic needs.

5. Description of the Recommended Project: Plan and carry out a photo-point monitoring system. Retake worthwhile historical photographs, take documentary photographs of management programs and quantitative studies, and establish photo-monitoring of vegetation changes or plant communities not assessed by quantitative monitoring.
   Photo-monitoring will enhance quantitative monitoring to evaluate and document vegetation changes resulting from management programs. Systematic photo-monitoring can serve as a memory for managers whose short-term tenure precludes observing long-term changes. Photo-monitoring enhances the information base for making decisions.

   The photo-point monitoring should also be done in conjunction with the long-term monitoring plans for the park (Proj. No. N46). Archeological sites, native vegetation types, and sites where historic photographs currently exist should be considered as photo-point sites. All data and information collected should be collected using standardized methods and protocols (and be compatible with GIS) and should be stored in a method

consistent with the Data Management Plan (Proj. No. N60).

6. Alternative Action/Solution and their Probable Impact: No action will result in park staff having to rely on traditional techniques and methods for making judgements about and preparing solutions for resource management issues. Visual condition patterns and changes of resources will not be documented. Undesirable changes in some resources may continue to go undetected with the possibility of the Park Superintendent failing to meet minimum standards in resources protection.

7. Compliance: None needed.

8. Funding Requirements:

| | Year 1 | Year 2 |
|---|---|---|
| Equipment for Photo-point System to be Used for all Long Term Monitoring Programs | | $2,000 |
| Salary (Biotech GS-5 0.1 FTE) | 1,900 | 1,900 |
| Search for Historic Kalaupapa Related Photos (cross-referencing with both cultural and natural resources) | | 3,000 |
| Acquisition of Historic Photos (Donations & Copies) | | 5,000 |
| Basic Photo Interpretation Equipment (light table, planimeter, mapping, stereo-viewers, drafting supplies, digitizer, projector mapper, etc.) | 6,000 | |
| Total | $7,900 | $11,900 |

## PROJECT STATEMENT

1. Project Number: KALA-C-039

2. Project Title: Conduct Archival and Archeological Study of Mahele Awards

3. Servicewide Issue: C08 - Need for Historic Resource Studies
   C02 - Inadequate Archeological Survey and Inventory

4. Problem Statement: Before the establishment of the Hansen's Disease settlement in 1866, laws were passed giving individuals, including lesser chiefs and commoners, property rights. This period of distributing lands to those who made claims was called the Mahele. More information is needed on who received the Land Commission Awards and what was done with the land on the peninsula.

5. Description of the Recommended Project: Conduct an archival study of the Mahele Awards at Kalaupapa. Work would focus mostly in Honolulu at the Bishop Museum and the State of Hawaii Archives. This project should be started after the Archival Research for Pre-1866 Kalaupapa (Proj. No. C21) is completed and should build on any information collected during that project. In addition to archival research, an archeological project should be done to map any walls or structures associated with the Mahele Awards. A final report should be completed containing maps, archeological information and a bibliography of sources.

6. Alternative Action/Solution and their Probable Impact: No action will result in a continuing lack of knowledge about the history of the Mahele Awards on the peninsula.

7. Compliance: None needed.

8. Funding Requirements:

| | |
|---|---|
| Personnel (Archeologist GS-11 0.3 FTE, 2 Arch. Technicians GS-5 0.3 FTE, Research Assistant GS-7 0.5 FTE) | $32,600 |
| Supplies (Duplication & Arch. Equipment) | 3,000 |
| Report Preparation/Publication | 3,000 |
| Other (Travel and Per Diem) | 3,000 |
| Total | $41,600 |

## PROJECT STATEMENT

1. Project Number: KALA-I-040

2. Project Title: Implement Geographic Information System (GIS)

3. Servicewide Issue: N24 - Other Issues

4. Problem Statement: Few NPS areas are as complex as Kalaupapa National Historical Park. Natural and cultural resources occur densely and often in close juxtaposition. Knowledge of distribution, importance, extent of natural and cultural resources is generally not documented, but is often empirical. The park is in the early stages of a long data-gathering phase. It is important to be able to gather data in such a way that it can be stored, retrieved, and manipulated. Such information would be more easily perceived and managed if it was organized using the Geographic Information System (GIS).

5. Description of the Recommended Project: Develop GIS capability at Kalaupapa. Buy GIS equipment and develop skills to use it. The park has an unusually good opportunity to gather and assemble information, as the park is at a threshold of long-term data gathering while costs for GIS equipment and ease of use are feasible. The potential for optimum value to the park is very high. Initial training could start at the Pacific Area office in Honolulu, but as natural and cultural resource projects gain funding and momentum, a work space should be set up at Kalaupapa to handle the data.

6. Alternative Action/Solution and their Probable Impact: No action will result in a scattered and fragmented data base. Continue to muddle through by logging information in files and/or relying on staff memory. Suffer loss of collective knowledge about locations or important resources and facilities when staff changes in composition.

   A second alternative is to assemble geographic information by traditional means. This is inherently inefficient and often unreliable, and poses difficulties in assimilating data about different categories of information.

7. Compliance: None needed.

8. Funding Requirements:

| | Year 1 |
|---|---|
| Personnel (Biological Technician GS-7 1.0 FTE) | $22,800 |
| Supplies (Computer and Software) | 6,000 |
| Total | $28,800 |

## PROJECT STATEMENT

1. Project Number: KALA-N-041

2. Project Title: Inventory Prehistoric Avifauna from Caves, Dunes, Cliffs, and Other Appropriate Sites

3. Servicewide Issue: N20 - Lack of Basic Data

4. Problem Statement: Alien organisms including mongoose, rats, people and mosquitoes (carrying avian malaria) have caused native avian species in Hawaii to decline. Before restoration of habitat and possible reintroduction of certain species can be considered as a management option, more information is needed on the bird species that were found here before the arrival of Captain Cook in 1778.

5. Description of the Recommended Project: Conduct paleontological surveys and cooperate with archaeologists surveying sites that potentially contain bird remains (hearths, middens, cliff sink holes, lava tubes, dunes, etc.).

6. Alternative Action/Solution and their Probable Impact: No action would result in no information on which to base management decisions on and possible resulting restoration projects.

7. Compliance: None needed.

8. Funding Requirements:

| | |
|---|---|
| Contract with CPSU/UH | $25,000 |

## PROJECT STATEMENT

1. Project Number: KALA-N-042

2. Project Title: Inventory Biotic and Physical Resources of Lake Kauhako

3. Servicewide Issue: N20 - Lack of Basic Data

4. Problem Statement: A reconnaissance level survey of Lake Kauhako was conducted in 1973-1974 by J.A. Maciolek. He collected data on several water quality parameters, aquatic biota and flora, including macro-invertebrates, plankton, and zooplankton. No fish were present.

This work provides excellent baseline data to which current synoptic sampling can be compared. Such comparisons may show significant environmental changes in the aquatic ecosystems. For example, vegetation immediately surrounding the lake is more dense than it has been historically. Maciolek's paper also said that this lake is an anchialine pool with brackish water. It is separated a considerable distance from the ocean, but does exhibit tidal fluctuations of a few inches.

Additional work to be done in Lake Kauhako includes taking and analyzing pollen profiles. Kauhako Crater was a site of intense Polynesian agriculture. Since World War II, agriculture has been abandoned and much of the area has been colonized by alien plants. A few pockets of native and Polynesian introductions remain. The park proposes to eventually restore native vegetation to the crater. However, an understanding of what vegetation grew and existed in the crater is unknown.

A recent cultural resources survey of Kauhako Lake demonstrated substantial sediments on submerged ledges of the lake. The sediments are a potential source of preserved pollen grains which can be identified and probably contain information indicating abundances of vegetation species through time. Wind-pollinated species are favored because they are produced in large numbers and released into the air. Other forms, however, are occasionally found. Major changes, particularly associated with human activity, are frequently very evident. There is, then, the potential to determine the time and changes in the vegetation when Hawaiian colonized the peninsula, when Western civilization began to have an impact, and when the decline of agriculture happened during the quarantine era.

5. Description of the Recommended Project: Monitor the lake every five years. To monitor use the parameters that Maciolek used in 1973-1974 for water quality and biological species. Investigation will look for changes or anomalies that may require further study. Monitoring may reveal the lake is receiving contaminants via either the ground water or surface water sources that supply the lake.

Project will be arranged through the University of Hawaii CPSU. A hydro-biological team will conduct the monitoring program. The monitoring protocols set up be Maciolek need to be followed and appropriate park personnel needs to be trained in their implementation. For monitoring details, see "Lakes and Lake-like Waters of the Hawaiian Archipelago," Occasional Papers of Bernice P. Bishop Museum, Honolulu, Volume No. 1, April 30, 1982, 14 pp. by J.A. Maciolek.

In addition, take cores of sediments from various depths of the lake and preserve them for further study. Locate macrospecimens at various levels and have them dated by carbon-date including the isotope ratio correction factor. Sample the cores at regular intervals and identify pollen grains and count the numbers in each group. The product will be a technical report detailing the pollen diagram and its interpretation for each core individually and then collectively for all cores.

6. Alternative Action/Solution and their Probable Impact: Continue current activities. No additional study of the lake can be anticipated and knowledge about the lake's resources will remain fragmentary.

7. Compliance: None needed.

8. Funding Requirements:

| | Year 1 | Year 2 |
|---|---|---|
| Monitoring (Personnel & Supplies) | $5,000 | |
| Preparation of Data and Interpretive Report with Recommendations based on earlier comparative work of Maciolek | | 2,000 |
| Personnel (Researcher with Pollen Analysis Experience GS-11 0.2 FTE) | 6,800 | 6,800 |
| Core Sampling | 2,000 | |
| Produce Pollen Report | | $3,000 |
| Travel | 1,000 | |
| Per Diem | 1,000 | |
| Total | $15,800 | $11,800 |

## PROJECT STATEMENT

1. Project Number: KALA-N-043

2. Project Title: Inventory Current Distribution and Abundance of Bird and Bat Populations in Major Habitats (Upland and Lowland)

3. Servicewide Issue: N20 - Lack of Basic Data

4. Problem Statement: Limited historic and prehistoric information indicates native avifauna and bats were, at one time, much more diverse within the park's boundaries. Management of bird resources within the park depends upon establishing a current baseline of data information. This information includes distribution, abundance, and status of existing resident and transient native birds as well as the endemic bat.

5. Description of the Recommended Project: Conduct avifauna and bat surveys in these habitats within the park:

   1) Coastal for seabirds, shorebirds and bats and marine (offshore islets).
   2) Peninsula and upland areas (including cliffs and forest) for forest birds, upland shorebirds, owls, bats, and nesting seabirds, maybe waterbirds.

   It is important to take the seasons into account when doing the surveys, especially for nesting seabird and shorebirds.

   Coastal and marine bird surveys would require four trips per year by two people staying three days each trip (taking into account the appropriate seasons).

   Peninsula and upland survey (including cliffs and forests) would require four people working for two weeks to establish a sampling framework (transects and other appropriate methods) in major habitat units. Sampling the transects would occur three times per year (May, August, October) in the forests and cliffs and two times per year on the peninsula.

6. Alternative Action/Solution and their Probable Impact: No action will result in no information on which to base management and/or restoration needs.

7. Compliance: None needed.

8. Funding Requirements:

**Costs for Coastal and Marine Bird Survey (4 trips/yr. for 2 people)**

| | |
|---|---|
| Personnel Services (Wildlife Biologist GS-9 0.1 FTE, Biotechnician GS-5 0.1 FTE) | $4,700 |
| Travel | 1,200 |

| | |
|---|---|
| Per Diem | 3,600 |
| Supplies | 300 |
| Total | $9,800 |

**Costs for Peninsula and Upland Transect Est. & Monitoring (3 trips/yr. 4 people)**

| | |
|---|---|
| Personnel (Biologist GS-9 0.2 FTE, | |
| 3 Biotechnicians GS-5 0.2 FTE) | $16,700 |
| Travel | 2,400 |
| Per Diem | 16,800 |
| Supplies | 2,000 |
| Total | $37,900 |
| **GRAND TOTAL** | **$47,700** |

## PROJECT STATEMENT

1. Project Number: KALA-N-044

2. Project Title: Inventory Land Mollusks in SEAs

3. Servicewide Issue: N20 - Lack of Basic Data

4. Problem Statement: Due to the presence of certain native species (some federally endangered) known to exist in the adjacent Kamakou Nature Conservancy Reserve, there is reason to believe native land mollusks survive within the park. In addition, some alien species are serious pests including the African snail and carnivorous snail. Park managers need to know distribution and abundance information on both native and non-native land mollusks within their boundary to make sound management decisions.

5. Description of the Recommended Project: Conduct inventory in selected areas of all major vegetation types in the park. Record presence, abundance and distribution of land mollusks. Surveys would emphasize non-destructive sampling techniques.

6. Alternative Action/Solution and their Probable Impact: No action will result in a lack of data and information on which to base management decisions. With possible future listings of native land mollusks on the endangered species list, Kalaupapa needs to compile information now on the possible presence of the species and threats to them. Without this information, Kalaupapa will be forced to make uninformed management decisions to protect its resources.

7. Compliance: Section 7 consultation.

8. Funding Requirements:

| | |
|---|---|
| Personnel (UH Researcher) | $2,400 |
| Travel | 600 |
| Per Diem | 1,500 |
| Supplies | 500 |
| Total | $5,000 |

## PROJECT STATEMENT

1. Project Number: KALA-C-045

2. Project Title: Conduct Archival Study of 1840's Sweet Potato Industry

3. Servicewide Issue: C08 - Need for Historic Resource Studies

4. Problem Statement: During the 1840's, the sweet potato industry in Hawaii increased to supply the demand for the California Gold Rush. Kalaupapa helped meet that demand for sweet potatoes. As of now, little else is known about that time.

5. Description of the Recommended Project: Conduct an archival study of the 1840's sweet potato industry on Kalaupapa. Work would focus mostly in Honolulu at the Bishop Museum and the State of Hawaii Archives. This project should be started after the Archival Research for Pre-1866 Kalaupapa (Proj. No. C21) is completed and should build on any information collected during that project. In addition to archival research, conversations with current residents may also reveal information and documents on the 1840's sweet potato industry. A final report is required with a complete bibliography.

6. Alternative Action/Solution and their Probable Impact: No action will result in a continuing lack of knowledge about the history of the Kalaupapa peninsula.

7. Compliance: None needed.

8. Funding Requirements:

| | |
|---|---|
| Personnel (Research Assistant GS-7 0.5 FTE) | $11,400 |
| Supplies (Duplication) | 1,000 |
| Other (Travel and Per Diem) | 2,000 |
| Total | $14,400 |

## PROJECT STATEMENT

1. Project Number: KALA-N-046

2. Project Title: Design and Implement Long-Term Vegetation Monitoring Program

3. Servicewide Issue: N20 - Lack of Basic Data

4. Problem Statement: The vegetation of Kalaupapa is not understood sufficiently for research, monitoring, and management purposes. No quantitative system to assess vegetation changes in Kalaupapa has been established. Successional changes resulting from removal of livestock are underway in the peninsula, with massive alien plant encroachment in some areas. Continued ungulate damage is gradually impoverishing native vegetation in many areas, whereas areas where feral animals are removed will undergo an undetermined degree of recovery. Management of this system requires a network of permanently-marked sampling sites and photo-points that will reveal ecological trends such as invasion of new alien species and recovery or degradation of native plant populations.

5. Description of the Recommended Project: After a comprehensive plant inventory is successfully completed (Proj. No. N15), transects need to be established in the Special Ecological Areas (SEAs) for the assessment of alien plant threats and the development of control strategies. The second task is to establish a comprehensive network of transects, photopoints, and permanently marked vegetation plots in diagnostic sites throughout the park. Institutionalize long-term monitoring through publishing the methodology in a CPSU report. During the first year, a methodology for gathering monitoring data would be developed and then initiated. Permanent marking of transects and plots would occur. During the second year, CPSU reports would be published with a checklist of the plants in the park and monitoring protocols.

6. Alternative Action/Solution and their Probable Impact: No action will result in a lack of information on status of both native and alien plants, and intelligent management decisions will not be made.

7. Compliance: None needed.

8. Funding Requirements:

| | Year 1 | Year 2 |
|---|---|---|
| Personnel (Vegetation Specialist GS-09 0.2 FTE, Biotechnician GS-05 0.3 FTE) | $11,200 | $11,200 |
| Travel | 1,000 | 1,000 |
| Per Diem | 2,000 | 2,000 |
| Supplies | 3,000 | 500 |
| Total | $17,200 | $14,700 |

## PROJECT STATEMENT

1. Project Number: KALA-N-047

2. Project Title: Develop and Implement Bird Monitoring Program in Selected Areas

3. Servicewide Issue: N20 - Lack of Basic Data

4. Problem Statement: Current bird distribution and abundance are not known for the national park. Proj. No. N43, "Inventory Current Distribution and Abundance of Bird and Bat Populations in SEAs" will gather initial information on the location and status of birds within Kalaupapa National Historical Park. Once native and federally endangered and threatened bird populations have been identified, the information gained should be used to start a long-term and consistent monitoring program.

5. Description of the Recommended Project: The monitoring will reveal ecological trends and possible threats to the avifauna and allow management actions to be initiated, if necessary. Transects and locations established by the inventory (Proj. No. N43) would be used for the long-term monitoring program including habitat areas such as coastal strand, peninsula flats, offshore island, and cliff faces. The program will provide valuable information on the changes of avifauna, population and distribution over time, and the effect resource management actions are having on bird populations.

6. Alternative Action/Solution and their Probable Impact: No action will result in a lack of knowledge as to the health and status of native and non-native bird populations.

7. Compliance: None needed.

8. Funding Requirements:

| | |
|---|---|
| Personnel (Biologist GS-9 0.2 FTE, Biotechnician GS-5 0.3 FTE) | $11,200 |
| Travel and Per Diem | 3,000 |
| Supplies | 500 |
| Total | $14,700 |

**PROJECT STATEMENT**

1. Project Number: KALA-N-048

2. Project Title: Control Ungulates in Kauhako Crater (SEA)

3. Servicewide Issue: N04 - Degradation of Park Resources Due to Non-native Animals

4. Problem Statement: Kauhako Crater is listed as a Special Ecological Area (SEA) in the park (See page 21). Pigs, goats and deer are threats to the native vegetation and remnant forest found in crater. Pigs root in forest understory destroying native plants and encouraging weed establishment. Pigs have also caused damage to archeological sites. Pigs, goats and deer are responsible for increasing erosion and contaminating the anchialine pool at the bottom of the crater. The feces of these non-native animals can enrich the pool disrupting the native aquatic ecosystem favoring rank algal growth to the detriment of the anchialine fauna.

5. Description of the Recommended Project: Survey to collect baseline data for the abundance and distribution of pigs, goats and deer in the crater. Establish a permanent monitoring system in the crater and develop photo-points. Then, after surveying, a four-foot wide area would be cleared around the outer rim of Kauhako Crater. A pig-proof fence (similar to those in Haleakala National Park and Hawaii Volcanoes National Park) will be constructed along the cleared rim.

   Feral animals will then be removed from the enclosure using methods suggested by the Animal Control Research Consortium and approved by the National Park Service.

   Permanent transects and photo-points will be set up to record and monitor the amount of feral animal and deer disturbance and, after pigs are removed, the rate of plant recovery and the amount of non-natives and native plants establishing themselves in pig-disturbed areas.

6. Alternative Action/Solution and their Probable Impact: No action will result in feral pigs, goats and deer continuing to damage various natural and cultural resources. The archeological resources, many of them still not adequately studied, could be destroyed.

7. Compliance: NHPA.

8. Funding Requirements:

| | |
|---|---|
| Personnel (Biologist GS-9 0.3 FTE, 2 Biotechnicians GS-5 0.4 FTE) | $23,100 |
| Supplies | 10,000 |
| Travel | 1,000 |
| Per Diem | 2,500 |

| | |
|---|---|
| Total | $36,600 |

## PROJECT STATEMENT

1. Project Number: KALA-N-049

2. Project Title: Control Ungulates on Sea Cliffs (SEA)

3. Servicewide Issue: N04 - Degradation of Park Resources Due to Non-Native Animals

4. Problem Statement: The sea cliffs, rising from 1,600 to 3,000 feet above the Kalaupapa peninsula and along the north shore of Moloka`i, are the site of several listed and proposed endangered species including Panicum fauriei var. carteri and Brighamia rockii. There are also numerous caves and lava tubes which are a potential source of paleontological and cultural resources. The cliffs also provide nesting sites for native and endangered birds including the Newell's shearwater, Dark-rumped petrel, and the Dark- banded petrel.

5. Description of the Recommended Project: To restrict access by the feral animals, fence the cliff habitat. Working under the guidelines suggested by the Animal Research Consortium, allow public hunting along the cliffs. Monitor feral animal damage to determine effectiveness of program. The monitoring program also needs to determine the presence of mongoose and feral cat populations. These animals threaten nesting native birds by preying upon eggs and young fledglings. If a detrimental population of feral cats and mongooses is found, then a removal program needs to be developed and implemented. One method for removing feral cats and mongooses in developed areas is the use of the chemical, diphacinone. This method, however, has yet to be approved for use in natural areas by the Environmental Protection Agency.

6. Alternative Action/Solution and their Probable Impact: No action will result in the continuing loss of endangered species and other resources.

   A second option is to fence known habitats and locations of endangered plant species. This is an extremely expensive operation, and many locations are difficult and dangerous to fence making it hazardous as well.

   A third option is to institute an aerial hunting program using helicopters and infrared spotters. In addition, trap lines would be run along bare spots and the summit of cliffs. This option is expensive and would limit public hunting opportunities.

7. Compliance: Endangered Species Act. Section 7 consultation.

8. Funding Requirements:

   Personnel (Biologist GS-9 0.2 FTE, Law Enforcement Ranger GS-9 0.2 FTE,
   2 Biotechnicians GS-5 0.3 FTE) $22,000

| | |
|---|---|
| Supplies (Fencing Materials) | 10,000 |
| Helicopter Rental | 14,000 |
| Other | 2,500 |
| Total | $48,500 |

## PROJECT STATEMENT

1. Project Number: KALA-N-050

2. Project Title: Control Ungulates in Pu`u Ali`i Plateau (SEA)

3. Servicewide Issue: N04 - Degradation of Park Resources Due to Non-native Animals

4. Problem Statement: Pigs, goats and deer are destroying the 1,300-acre native forest, the Pu`u Ali`i Plateau, within the boundaries of Kalaupapa National Historical Park. Pu`u Ali`i is considered a Special Ecological Area (SEA) within the park (See page 21). Pigs root in understory destroying rare native plants and introducing alien weeds that degrade the quality of habitat for native organisms. Goats browse native understory inhibiting normal reproduction and open up the forest to invasion by alien weeds. An effective animal-proof fence has been constructed adjacent to the park boundary by the Nature Conservancy and another has been constructed within the plateau, effectively containing the pig and goat populations. All removal methods will be made based on recommendations from the Animal Control Research Consortium as an inter-agency and community effort with the State Department of Land and Natural Resources (DLNR).

5. Description of the Recommended Project: With completion of one mile of goat and pig-proof fence within Pu`u Ali`i Plateau and Natural Area Reserve, concentrated removal of the ungulates within the fenced area has begun.

Feral animals are now being removed from the area using methods suggested by the Animal Control Research Consortium and approved by the National Park Service and the State DLNR. Currently, the most agreeable removal consists of using local hunters. Due to its remote location, hunters need to be brought in by helicopter.

Data on health, sex and age of ungulates captured during control activities will be compiled. Monitoring needs to assess the amount of pig damage still occurring and determine the effectiveness of using only hunters. Other methods may need to be added to increase the effectiveness of the program. Photo-points have been established and need to be revisited to monitor the amount of ungulate damage and the signs of forest recovery or future problems.

6. Alternative Action/Solution and their Probable Impact: No action will result in feral pigs, goats and deer continuing to damage various natural and cultural resources. The native forest habitat will be wiped out, and native forest birds will suffer.

7. Compliance: None needed.

8. Funding Requirements:

| | |
|---|---|
| Personnel (Biologist GS-9 0.1 FTE, Biotechnician GS-5 0.1 FTE) | $4,700 |
| Hunters (Local Volunteers) | -0- |
| Helicopter ($700/hr.) | 5,600 |
| Supplies (equipment for monitoring and ungulate removal) | 1,000 |
| Other (Travel & Per Diem) | 2,000 |
| Total | $13,300 |

## PROJECT STATEMENT

1. Project Number: KALA-N-051

2. Project Title: Eradicate Invasive Alien Plants in Pu`u Ali`i Plateau (SEA)

3. Servicewide Issue: N05 - Degradation of Park Resources Due to Non-Native Plants.

4. Problem Statement: The `Ohi`a\Mixed Shrub Montane Wet Forest community is the vegetation type found in the Pu`u Ali`i Natural Area Reserve. Currently, the native plants are threatened by invasive, non-native plants including

| | |
|---|---|
| broomsedge | Andropogon virginicus |
| bog rush | Juncus effusus |
| | Centella asiatica |
| fireweed | Erechtites valerianifolia |
| hairy cat's ear | Hypochoeris radicata |
| Hilo grass | Paspalum conjugatum |
| carpetgrass | Axonopus fissifolius |
| white ginger | Hedychium coronarium |
| glenwood grass | Sacciolepis indica |
| thimbleberry | Rubus rosifolius |

The priorities for removal include the Hilo grass and the broomsedge. The carpetgrass, ginger, and glenwood grass all have the potential to spread and replace the native species.

5. Description of the Recommended Project: To effectively remove the invasive, non-native plant species from a sensitive area like Pu`u Ali`i, manual removal of the plants is the recommended method. The uprooted plants should then be removed from the site to prevent them for re-establishing. A grid pattern should be developed and followed to remove the species.

6. Alternative Action/Solution and their Probable Impact: No action will result in alien plants continuing to spread and push out native plants. The non-natives establish in areas that have been disturbed (i.e. from pig or storm damage). Their populations push out native plants.

Another option is herbicide use. However, in this sensitive area, there are too many unknown factors. First, the amount of herbicide necessary to effectively kill non-native plants is unknown. Second, herbicides are not effective on ginger plants, and there is not enough information to determine its effectiveness on other non-native plants. The third limiting factor with herbicide use is the feasibility of using a backpack sprayer in the cloud forest. It is a cumbersome apparatus and could be more harmful than beneficial in the forest.

7. Compliance: None needed.

8. Funding Requirements: (for 8 weeks of removal)

| | |
|---|---|
| Helicopter Travel (3 hrs./week for humans and removal of alien plants) $16,800 | |
| Personnel (Biologist GS-9 0.2 FTE, 2 Biotechnicians GS-5 0.2 FTE) | 13,000 |
| Supplies | 1,000 |
| Travel | 600 |
| Per Diem ($20/day for Backcountry) | 1,200 |
| Total | $32,600 |

## PROJECT STATEMENT

1. Project Number: KALA-N-052

2. Project Title: Control Localized Populations of Non-Native Plants

3. Servicewide Issue: N05 - Degradation of Park Resources Due to Non-Native Plants

4. Problem Statement: There is a need to remain vigilant in the control of new introductions of plant species in the park. The area around the Kalaupapa settlement and dump are particularly susceptible to accidental introductions of non-native plants by humans. Localized weeds are targeted for control because they have the potential to spread and disrupt park ecosystems, as shown by their behavior in other parts of the state where they displace native vegetation and some can form monospecific stands. The history of population dynamics in Hawai`i and some other tropical environments indicates that populations of highly aggressive and disruptive species may occur at very low numbers for many years prior to sudden expansion. Control of localized weeds in developed areas will prevent future problems.

5. Description of the Recommended Project: Control potentially disruptive non-native plant species while they are still localized, using herbicidal or preferably, manual/mechanical means, if effective. Focus on the road to Kalawao, roads surrounding the settlement, and the trail to topside Moloka`i for new introductions. These actions will help prevent the establishment of new species in Kalaupapa. In turn, native ecosystems will be protected and costly future control programs precluded.

6. Alternative Action/Solution and their Probable Impact: No action will result in the continual introduction of non-native plants in Kalaupapa. Over time, these localized introductions could expand and become as problematic as Christmasberry, haole koa and lantana currently are.

7. Compliance: None needed.

8. Funding Requirements:

| | Year 1 |
|---|---|
| Personnel (WG-9 Pest Controller - .1 FTE, WG-5 Laborers (2) - .1 FTE) | $8,800 |
| Supplies | 1,000 |
| Total | $9,800 |

## PROJECT STATEMENT

1. Project Number: KALA-C-053

2. Project Title: Conduct Archeological Survey of Collapsed Lava Tube/Kauhako Trench

3. Servicewide Issue: C02 - Inadequate Archeological Survey & Inventory

4. Problem Statement: One of the requirements of the enabling legislation for Kalaupapa National Historical Park is to preserve cultural and historical resources. The collapsed lava channel that leads out of Kauhako Crater in a northwesterly direction contains abundant archeological remains that reflect the use of the area by the Hawaiians in both prehistoric and historic times. There are remains of a trail paved with flat stone slabs in the bottom of the channel. The archeological resources in this area have never been recorded or mapped.

5. Description of the Recommended Project: Conduct an intensive archeological survey of the collapsed lava channel to identify, record, and map the archeological resources that exist there. Research historical documents and photographs to gather all available background information before starting fieldwork. Conduct on-the-ground intensive transect surveys utilizing chainsaws and other hand tools to clear alien vegetation where necessary. The archeologist and his crew will work closely with botanists to ensure that no native species are cut. The archeologist will prepare a final report that will be published in the WACC Publications in Anthropology series. In addition to the final report, a series of archeological base maps will be produced showing the results of the survey.

6. Alternative Action/Solution and their Probable Impact: No action will result in a lack of information about the archeological resources of the Kauhako Trench.

7. Compliance: Contact SHPO of survey plans.

8. Funding Requirements:

| | |
|---|---|
| Personnel (Archeologist GS-11 1.0 FTE, | |
| 4 Arch. Technicians GS-5 0.3 FTE | $55,800 |
| Supplies | 2,000 |
| Report Preparation/Publication | 5,000 |
| Other (Travel & Per Diem) | 3,200 |
| Total | $66,000 |

## PROJECT STATEMENT

1. Project Number: KALA-C-054

2. Project Title: Conduct Archeological Survey of Kauhako Crater

3. Servicewide Issue: C02 - Inadequate Archeological Survey and Inventory

4. Problem Statement: One of the requirements of the enabling legislation for Kalaupapa National Historical Park is to preserve cultural and historical resources. The first step in doing that is identifying and recording those resources so park managers know what the resource base is before making decisions which affect it. Kauhako Crater was intensively utilized by the Hawaiians prehistorically and historically. Dozens of archeological sites exist in the crater and there is at least one historic photograph from c. 1890 that shows extensive agricultural field systems in the crater. These resources have never been recorded or mapped.

5. Description of the Recommended Project: Conduct an intensive archeological survey of Kauhako Crater, concentrating on the major terrace in the crater. Research historical documents and photographs to gather all available background information. Establish permanent reference points utilizing chainsaws and other hand tools to clear vegetation where necessary. Survey crew will consist of an archeologist and four archeological technicians. The archeologist will work closely with a botanist to make certain no native species are damaged. The archeologist will prepare a final report that will be published in the WACC Publications in Anthropology series. In addition to the final report, a series of archeological base maps will be produced showing the results of the survey.

6. Alternative Action/Solution and their Probable Impact: No action will result in a continued lack of knowledge about the archeological resources of Kauhako Crater.

7. Compliance: Inform SHPO of survey plans.

8. Funding Requirements:

| | |
|---|---|
| Personnel (Archeologist GS-11 1.0 FTE, 4 Arch. Technicians GS-5 0.3 FTE) | $55,800 |
| Supplies | 2,000 |
| Report Publication/Preparation | 5,000 |
| Other (Travel & Per Diem) | 3,200 |
| Total | $66,000 |

## PROJECT STATEMENT

1. Project Number: KALA-N-055

2. Project Title: Monitor Pelagic Shoreline Debris

3. Servicewide Issue: N24 - Other Need for Specialized Study for Complex Management Issue

4. Problem Statement: The location of the park in the oceanic current system results in accumulation of much drifting debris on beaches and other shoreline substrata. Besides creating an eyesore and a threat to the native coastal plant life, marine debris has been recognized as a source of serious problems for the survival and health of many marine animals including fish, turtles, sea birds, and marine mammals. The major problems identified are (1) clogging of the digestive tract after ingestion and (2) entanglement leading to strangulations, drowning or morbidity resulting from restricted movements. A great variety of materials drift ashore; the most damaging materials appear to be plastics of many kinds including derelict fishing nets, can stops, bags, and beads. The problem is international in scope, and two recent international symposia on the subject have been held. The NMFS has a national program of investigations, and the NPS participates in assessments by monitoring debris at a number of coastal park sites. Monitoring in this park will contribute to the national NPS program and provide information on the nature and extent of the problem in the park. As the marine fauna in the park are assessed, the information on debris will be useful in determining the importance of clean-up efforts and identifying important locations. The location of the peninsula presents unique opportunities to learn about drift of debris in this remote, windward part of the archipelago. It almost the only practical location for such monitoring on the north shore of Moloka`i.

5. Description of the Recommended Project: Systematic monitoring of the entire park shoreline will begin on an infrequent schedule, with some concentration in more accessible and logistically practical areas. Data will be kept on the amount and location of each major type of drift debris, together with data and time of observation and stage of the tidal cycle. Samples of common and potentially dangerous debris will be collected for consultation with marine wildlife specialists regarding the level of hazard for particular animals. After several cycles of initial monitoring, a more refined schedule will be developed, emphasizing the portions of the coast that have been shown to receive the most debris and taking into account the observed frequency of arrival. Results will be compared with the occurrence and distribution (concentration) of the most sensitive fauna, as determined by other studies in the park (e.g. turtles, sea birds). Where these results indicate that protection of particular areas is needed, the emphasis (location and frequency) of monitoring will be shifted accordingly. In all these monitoring efforts, potentially hazardous debris will be removed to the extent feasible during monitoring. In identified sensitive areas where there appear to be existing hazards to wildlife, removal

will be regularly scheduled based on the results of monitoring. Any sightings of animals distressed or killed by debris will be reported with full details. Where possible, entangled animals will be freed. Where feasible, carcasses of the less common, sensitive, large animals (e.g. seals, turtles, sea birds) will be preserved for autopsy by NMFS specialists. The current debris monitoring program at Kaloko-Honokohau NHP may provide a useful model.

The project is closely related to the proposed assessment of marine resources and relies upon it for the identification and localization of sensitive animals. A project on sea birds would be valuable (among other reasons) to supply such information. Since some debris probably originates on the local shore, there may be a relationship to the portion of the inshore marine water quality study that deals with dumps/landfills.

6. Alternative Action/Solution and their Probable Impact: No action. The potential hazard to wildlife will remain unknown unless by chance stranded carcasses with obvious debris-induced mortality are found. The opportunity to learn about drift of debris in this unique, remote, far-windward location of archipelago will be lost.

A completely volunteer effort, organized by park people with appropriate local groups, might produce some useful data. It might be somewhat less costly, although staff time would be required to coordinate with volunteers. The scheduling, quality and consistency of data would almost certainly by poorer. Analysis will require effort by management.

7. Compliance: None needed.

8. Funding Requirements:

| | |
|---|---|
| Personnel (Biotechnician GS-5 0.1 FTE) | $1,900 |
| Travel & Per Diem | 2,000 |
| Supplies | 1,000 |
| Total | $4,900 |

## PROJECT STATEMENT

1. Project Number: KALA-N-056

2. Project Title: Develop Oil Spill Contingency Plans

3. Servicewide Issue: N11 - Degradation of Park Water Quality Due to External Activities

4. Problem Statement: Kalaupapa National Historical Park is a peninsula on the north shore of the island of Moloka`i. Its proximity to major shipping lanes puts it at risk for an oil spill. The park has a variety of natural and cultural resources that need to be protected in the event of a hazardous materials spill at sea.

5. Description of the Recommended Project: Work with NPS Western Region (Contact: Heather Stone 415-744-3914) and U.S. Coast Guard, if necessary, to develop emergency plan detailing contacts and responsibilities of the NPS. If necessary, organize, train volunteers and have access to equipment in the event of a hazardous materials spill at sea. Do routine drills to maintain standards and update protection and hazardous materials removal techniques.

6. Alternative Action/Solution and their Probable Impact: Without the plan and advance preparation, the response time, in the event of an emergency, would likely increase allowing for more damage to natural and cultural resources to occur.

7. Compliance: None needed.

8. Funding Requirements:

| | |
|---|---|
| Personnel (Hazardous Materials Specialist GS-11 0.1 FTE) | $3,400 |
| Supplies | 500 |
| Total | $3,900 |

## PROJECT STATEMENT

1. Project Number: KALA-C-057

2. Project Title: Conduct Archeological Survey of Makanalua Area

3. Servicewide Issue: C02 - Inadequate Archeological Survey and Inventory

4. Problem Statement: Makanalua is the large land division in the center of the peninsula, sandwiched between Kalaupapa and Kalawao. It includes the Kauhako Crater and Kauhako lava tube (Kauhako Trench). The early Hawaiians used this area for agricultural and possibly for living. The archeological features are both prehistoric and historic and include terraces, walls, enclosures and heiaus (temples). Few of these features have been recorded and mapped in detail. The park manager is being expected to manage a resource about which she/he has very little information.

5. Description of the Recommended Project: Conduct an archeological survey of the Makanalua area. Research historical documents and photographs to gather all available background information. Establish permanent reference points utilizing chainsaws and other hand tools to clear vegetation where necessary. An archeologist and a crew of four archeological technicians will conduct an intensive survey of the area utilizing a transit, tapes, and compasses. All archeological features will be identified, recorded, and mapped. The archeologist will work closely with a botanist to make sure no native plants are damaged. A final report will be published in the WACC Publications in Anthropology series. This project, when combined with other archeological projects, will present a good sample of the archeological resources in the park. The areas to be included in a Makanalua archeological survey include Kapapakikane area, Kiikolu (around the lighthouse), Pu`u Uao (around the crater), Lahupuu to Kahaloko (mouth of Waihanau Valley), Waihanau Valley, and Ho`olehua area. Each of the six areas would require three months field work with another three months for the report to be prepared.

6. Alternative Action/Solution and their Probable Impact: No action is a failure to meet legislative mandates and would continue a practice of managing resources based on very little information.

7. Compliance: None needed.

8. Funding Requirements:

| | Year 1 |
|---|---|
| Personnel (Archeologist GS-11 0.5 FTE, 4 Arch. Technicians GS-5 0.3 FTE) | $39,000 |
| Supplies | 500 |
| Report Preparation/Publication | 5,000 |
| Other | 3,200 |

| | |
|---|---|
| Total | $47,700 |

## PROJECT STATEMENT

1. Project Number: KALA-I-058

2. Project Title: Develop Trail System Plan

3. Servicewide Issue: C17 - Control of Environmental Impacts

4. Problem Statement: The park currently has no system for maintaining or establishing foot trails that provide necessary access to archeological sites and other obscure natural and cultural resources. A map of existing trails needs to be developed in order to allow for others, beyond the archeologist, to be responsible for clearing and maintaining these trails. There are historic trails leading from the peninsula to topside Moloka`i, which could also be re-established.

5. Description of the Recommended Project: Prepare a map of currently established trails leading to various archeological sites. Develop a schedule with the maintenance division to maintain these trails. Develop proposal to re-establish Waihanau Trail.

6. Alternative Action/Solution and their Probable Impact: None.

7. Compliance: None needed.

8. Funding Requirements:

| | |
|---|---|
| Personnel (Vegetation Specialist/Technical Illustrator GS-7 0.1) | $2,300 |
| Supplies | 200 |
| Total | $2,500 |

## PROJECT STATEMENT

1. Project Number: KALA-N-059

2. Project Title: Develop a Regional Management Plan

3. Servicewide Issue: N24 - Other Issues

4. Problem Statement: Kalaupapa National Historical Park is small and obliged to deal with other agencies, some of whom own the land which the park manages. Resources and threats to them are shared as are responsibilities for managing them. However, mandates of other agencies are not identical with those of the NPS. Therefore, agreements need to be fashioned in order to avoid fragmenting the resource base and to maximize protection of natural and cultural resources within Kalaupapa.

   The area was set aside by the Congress to protect resources, yet Congress failed to consolidate land holdings under the jurisdiction of NPS. It is not likely that NPS will ever acquire all of the lands we are obliged to manage. Common agreement among agencies is needed in order to manage the land comprehensively.

5. Description of the Recommended Project: Develop and formalize long-term agreements with associated agencies to manage the Kalaupapa peninsula and associated highlands in a comprehensive manner. Assemble managers of all of the associated agencies of the peninsula, coastal, and adjacent upland areas, namely NPS, Department of Transportation, Department of Health, Hawaiian Home Lands, Division of Fish and Wildlife (Department of Land and Natural Resources), and The Nature Conservancy. Find areas of agreement concerning vision, priorities, and plans for Kalaupapa. Find and document areas in the various mandates where visions and plans overlap. Build agreements based on these areas of overlap. For example, reach consensus that protecting cultural and natural resources, promoting research, developing recreation potential, protecting patient life styles, and serving people are suitable topics for cooperation. Develop formal agreements, partnerships, and shared responsibilities for projects which promote these values.

6. Alternative Action/Solution and their Probable Impact: No action will result in management practices that reflect an uncertainty that the protection and capital improvements done in the park will last. Continue to manage under uncertainty and periodic inter-agency acrimony.

7. Compliance: None needed.

8. Funding Requirements: None. Superintendent can pursue this goal concurrently as a part of her/his management practices. No additional funding or staff are needed.

## PROJECT STATEMENT

1. Project Number: KALA-N-060

2. Project Title: Develop Data Management Plan

3. Servicewide Issue: N20 - Lack of Basic Data

4. Problem Statement: Previous studies done by visiting researchers to the park have been stored in a haphazard manner. There is no central database for the information, and no comprehensive listing of what has been done. The information gathered by the researchers was, for the most part, produced in documents that met their needs rather than the park's needs. The park is just beginning to collect large amounts of important baseline data regarding the status of many of its natural resources. The data needs to be collected in a way so that it can be stored, retrieved and utilized by the resource managers at the park. Specimens also need to be collected with thought to future uses.

5. Description of the Recommended Project: A data management collection plan needs to be developed for researchers and resource managers to use as a guide to collecting data in Kalaupapa. The plan should include a standard base map (compatible with GIS) and data entry programs that are available to the park (to be able to read and retrieve researchers' raw data). Guidelines should present acceptable formats and numbers of copies for reports.

6. Alternative Action/Solution and their Probable Impact: No action will result in the continuing haphazard collection of data based on the interests and needs of the researchers rather than the park.

7. Compliance: None needed.

8. Funding Requirements:

| | |
|---|---|
| Personnel (GS-9 0.1 FTE) | $2,800 |
| Travel | 1,000 |
| Per Diem | 3,000 |
| Supplies | 500 |
| Total | $7,300 |

## PROJECT STATEMENT

1. Project Number: KALA-N-061

2. Project Title: Develop Monitoring Protocols

3. Servicewide Issue: N20 - Lack of Basic Data

4. Problem Statement: To protect and preserve both its cultural and natural resources, Kalaupapa is starting the process of gathering baseline data. A long-term monitoring program needs to be set up for many areas, both cultural and natural, in the park. The special ecological areas (SEAs) need to have permanent transects established (Proj. No. N46) and photo-point monitoring needs to be done for many sites in the park (Proj. No. N38). Highly sensitive areas of the park including Pu`u Ali`i and Huelo Islet, need to have protocols for entering and working in those areas. With all the anticipated work, guidelines need to be established to protect the sensitive and unique natural resources of the area.

5. Description of the Recommended Project: A plan for monitoring needs to be developed which will describe long-term monitoring programs and methods of data collection. It will also allow for training of appropriate staff to participate in long-term monitoring methods.

6. Alternative Action/Solution and their Probable Impact: No action will result in confusion over the monitoring program. If it's not clear as to how and who completes the work, long-term monitoring may be ignored at the expense of the resources.

7. Compliance: None needed.

8. Funding Requirements:

| | |
|---|---|
| Personnel (Resource Management Specialist GS-9 0.1 FTE) | $2,800 |
| Supplies | 500 |
| Other (Travel and Per Diem) | 1,000 |
| Total | $4,300 |

## PROJECT STATEMENT

1. Project Number: KALA-C-062

2. Project Title: Conduct Archeological Survey of Kalawao Area

3. Servicewide Issue: C02 - Inadequate Archeological Survey and Inventory

4. Problem Statement: Although the first Hansen's Disease settlement was at Kalawao, there are only two historic structures, St. Philomena and Siloama churches, remaining from that settlement. There is abundant archeological evidence of human activities there, however. The archeological features are both prehistoric and historic and include terraces, walls, enclosures and heiaus (temples). None of these features have been recorded and mapped in detail. The park manager is being expected to manage a resource about which she/he has very little information.

5. Description of the Recommended Project: A large portion of the Kalawao area is relatively open forest with an intact overstory. An archeologist and a crew of four archeological technicians will conduct an intensive survey of the overstory area utilizing a transit, tapes, and compasses. All archeological features will be identified, recorded, and mapped. Because work will be limited to the overstory area, there should be very little cutting of vegetation. A final report will be published in the WACC Publications in Anthropology series. This project, when combined with other archeological projects, will present a good representative sample of the archeological resources in the park. The areas to be included in a Kalawao archeological survey include Kaupikiawa to Pu`u o Kalawao, Kamaumoe to Keananaluawahine (from coast to crater), Kiinui to Kuololimu (from coast to crater), Kawaha`alihi area (main settlement area), Wai`ale`ia Valley. Each of these five areas will take three months to survey with another three months for report preparation.

6. Alternative Action/Solution and their Probable Impact: No action is a failure to meet legislative mandates and would continue a practice of managing resources based on very little information.

7. Compliance: None needed.

8. Funding Requirements:

| | Year 1 |
|---|---|
| Personnel (Archeologist GS-11 0.5 FTE, 4 Arch. Technicians GS-5 0.3 FTE) | $39,000 |
| Supplies | 500 |
| Report Preparation/Publication | 2,000 |
| Other | 3,200 |

| | |
|---|---|
| Total | $44,700 |

**PROJECT STATEMENT**

1. Project Number: KALA-C-063

2. Project Title: Conduct Archeological Survey of the Kalaupapa Area

3. Servicewide Issue: C02 - Inadequate Archeological Survey and Inventory

4. Problem Statement: Kalaupapa is the western side of the Kalaupapa peninsula, and it encompasses all lands west of the Kauhako Crater. It includes the current Kalaupapa settlement. Hawaiians lived in this area before 1865 when the Hansen's Disease settlement became established at Kalawao. The archeological features are both prehistoric and historic and include terraces, walls, enclosures and heiaus (temples). Few of these features have been recorded and mapped in detail.

5. Description of the Recommended Project: Conduct a archeological survey of the Kalaupapa area. Research historical documents and photographs to gather all available background information. Establish permanent reference points utilizing chainsaws and other hand tools to clear vegetation where necessary. An archeologist and a crew of four archeological technicians will conduct an intensive survey of the area utilizing a transit, tapes, and compasses. A joint survey effort with the Hawaiian Home Lands' archaeologists could be initiated since, currently, most of the Kalaupapa settlement is owned by them. All archeological features will be identified, recorded, and mapped. The archeologist will work closely with a botanist to make sure no native plants are damaged. A final report will be published in the WACC Publications in Anthropology series. The areas to be included in the Kalaupapa archeological survey include Kalaemilo to Papaloa (beach houses to graveyards area), Kalaupapa Trail area, Kukuiohapuu area (above Kalaupapa trail), Kalahuhu to Kiokio (slopes of Pu`u Uao), and Waihanau Stream area (Kalaupapa portion of stream). Field work for each of the five areas would be three months with an additional three months for report preparation.

6. Alternative Action/Solution and their Probable Impact: No action is a failure to meet legislative mandates and would continue a practice of managing resources based on very little information.

7. Compliance: None needed.

8. Funding Requirements:

| | Year 1 |
|---|---|
| Personnel (Archeologist GS-11 0.5 FTE, 4 Arch. Technicians GS-5 0.3 FTE) | $39,000 |
| Supplies | 500 |
| Report Preparation/Publication | 5,000 |
| Other | 3,200 |

| | |
|---|---|
| Total | $47,700 |

## PROJECT STATEMENT

1. Project Number: KALA-C-064

2. Project Title: Conduct Archeological Survey of Nihoa Area

3. Servicewide Issue: C02 - Inadequate Archeological Survey and Inventory

4. Problem Statement: Nihoa is an isolated shelf of land beneath the cliffs west of Kalaupapa. The Nihoa area of the park contains many archeological features. The archeological features are both prehistoric and historic and include terraces, walls, enclosures and heiaus (temples). Few of these features have been recorded and mapped in detail. The park manager is being expected to manage a resource about which she/he has very little information.

5. Description of the Recommended Project: Conduct a archeological survey of the Nihoa area. Research historical documents and photographs to gather all available background information. Establish permanent reference points utilizing chainsaws and other hand tools to clear vegetation where necessary. An archeologist and a crew of four archeological technicians will conduct an intensive survey of the area utilizing a transit, tapes, and compasses. All archeological features will be identified, recorded, and mapped. The archeologist will work closely with a botanist to make sure no native plants are damaged. A final report will be published in the WACC Publications in Anthropology series. This project, when combined with other archeological projects, will present a good sample of the archeological resources in the park.

6. Alternative Action/Solution and their Probable Impact: No action is a failure to meet legislative mandates and would continue a practice of managing resources based on very little information.

7. Compliance: None needed.

8. Funding Requirements:

| | |
|---|---|
| Personnel (Archeologist GS-11 1.0 FTE, 4 Arch. Technicians GS-5 0.3 FTE) | $55,800 |
| Supplies | 500 |
| Report Preparation/Publication | 5,000 |
| Other | 3,200 |
| Total | $64,500 |

## PROJECT STATEMENT

1. Project Number: KALA-C-065

2. Project Title: Conduct Archeological Survey of Submerged Lands Surrounding Kalaupapa

3. Servicewide Issue: C02 - Inadequate Archeological Survey and Inventory

4. Problem Statement: The park boundaries extend for a quarter of a mile offshore. This submerged area possibly contains archeological features from previous time periods including fish walls and underwater wooden canoes, fresh water springs, caves and heiaus (temples). It also contains documented shipwrecks from historic times. None of these features have been recorded and mapped in detail. The park manager is being expected to manage a resource about which she/he has very little information.

5. Description of the Recommended Project: Conduct an archeological survey of the submerged areas surrounding Kalaupapa. Research historical documents and photographs to gather all available background information on possible sites. The NPS Submerged Cultural Resources Unit in Santa Fe, NM can supply the properly trained archeologist and crew. The team will conduct an intensive survey of the area utilizing appropriate underwater survey equipment. All archeological features will be identified, recorded, and mapped. To aid in mapping and identifying objects an aerial infra-red video of the submerged lands will be taken. A final report will be published in the WACC Publications in Anthropology series. This project, when combined with other archeological projects, will present a good sample of the archeological resources in the park.

6. Alternative Action/Solution and their Probable Impact: No action is a failure to meet legislative mandates and would continue a practice of managing resources based on very little information.

7. Compliance: None needed.

8. Funding Requirements:

| | |
|---|---|
| Personnel (Archeologist GS-11 0.8 FTE, 3 Arch. Technicians GS-7 0.3 FTE) | $47,200 |
| Supplies | 2,000 |
| Report Preparation/Publication | 5,000 |
| Other (Travel and Per Diem) | 10,000 |
| Total | $64,200 |

## PROJECT STATEMENT

1. Project Number: KALA-I-066

2. Project Title: Construct and Maintain Ethnobotanical Garden

3. Servicewide Issue: N08 - Loss of Cultural Landscapes

4. Problem Statement: Throughout the history of the Kalaupapa settlement, there have been various types of gardens. In the early days of the settlement, there was competition among the patients for the best garden. During WWII, there were victory gardens to provide patients with vegetables and fruits. There were gardens of ornamentals and gardens of plants used for medicinal purposes. As the resident patient community gets older, there is a tendency to allow more grass and to cultivate less garden.

5. Description of the Recommended Project: To maintain the cultural landscape of the settlement and to educate visitors about the park, an ethnobotanical garden is recommended. One possible location is the yard outside of AJA Memorial Hall. The garden should be divided into areas showing different types of typical time-period gardens. There should also be an area dedicated to growing plants, which were used for medicinal purposes.

6. Alternative Action/Solution and their Probable Impact: None.

7. Compliance: None needed.

8. Funding Requirements:

| | |
|---|---|
| Personnel (Vegetation Biotechnician GS-5 0.1 FTE) | $1,900 |
| Supplies | 600 |
| Total | $2,500 |

## PROJECT STATEMENT

1. Project Number: KALA-N-067

2. Project Title: Inventory Rat Populations in Special Ecological Areas (SEAs)

3. Servicewide Issue: N20 - Lack of Basic Data

4. Problem Statement: Problems caused by introduced rat species in terms of predation on birds, rare plants, and insects depends in part upon their distribution and abundance. At present, this is unknown. This preliminary survey will determine distribution, abundance, and breeding status of 3 Rattus species in the seven Special Ecological Areas (SEAs) of the park. These SEAs are defined as the most important terrestrial ecological areas in the park (See page 21).

5. Description of the Recommended Project: The approach to this study will be systematic sampling of the most important terrestrial ecological areas in the park by trapping along 500 meter transect lines with traps placed at 10 meter intervals. Animals captured over a three night period will be examined for species, sex, weight, and breeding condition (externally and internally). Trapping will be conducted in wet and dry seasons in each area (a total of two trapping seasons per area).

   This project will determine the potential importance of rats in important terrestrial ecological areas in the park. It will serve as a database for determining control priorities when compared with databases from other surveys of vulnerable birds and plants.

6. Alternative Action/Solution and their Probable Impact: No action will result in missing data with which to make sound, reasoned management decisions. The special ecological areas of the park are areas which were determined to be natural areas worth preserving. The more information collected about the status of the areas and possible threats to the areas will allow for better management decisions to be made.

7. Compliance: None needed.

8. Funding Requirements: (per year)

| | |
|---|---|
| Personnel (Biologist GS-9 0.1 FTE, Biotechnician GS-5 0.2 FTE) | $6,500 |
| Supplies & Equipment (traps, flagging & bait) | 11,200 |
| Air Travel | 2,000 |
| Per Diem | 2,500 |
| Total | $22,200 |

## PROJECT STATEMENT

1. Project Number: KALA-N-068

2. Project Title: Inventory Arthropod Taxa in SEAs

3. Servicewide Issue: N20 - Lack of Basic Data

4. Problem Statement: Little or no information about Kalaupapa's invertebrate fauna exists. However, the park is responsible for protecting the federal candidate and listed endangered species. Many taxa of arthropods and mollusks are proposed for federal listing in the near future. A survey of the natural-dominated areas in Kalaupapa is needed.

5. Description of the Recommended Project: Preliminary evaluation of the importance of seven terrestrial ecological areas (SEAs) will be made by entomologists based on vegetation and topographic maps, data from comparable areas, etc. Appropriate taxa will be selected for preliminary surveys. Among those to be considered are Megalagrion, Drosophila, long-jawed spiders, microlepidopterans, and native wasps. Preliminary surveys should also be conducted for alien Vespula and ants in each area.

   Preliminary information on the abundance, distribution, and diversity of key Hawaiian arthropod taxa and important alien species will be obtained. A database for these groups and accumulation of data can be started. Threats to the native species can then be determined, and management of their habitats can focus on these threats. A reference collection can also be established for the park.

6. Alternative Action/Solution and their Probable Impact: No action will result in a lack of information about the status of the species. If the species are listed as endangered species, the park will have to protect them and will be basing management decisions on insufficient data.

7. Compliance: None needed.

8. Funding Requirements: (per year)

| | |
|---|---|
| Personnel (Researcher GS-12 0.2 FTE, 2 Wildlife Specialists GS-7 0.2 FTE) | $17,300 |
| Supplies & Equipment | 5,000 |
| Other (Plane tickets & Per Diem) | 5,000 |
| Total | $27,300 |

## PROJECT STATEMENT

1. Project Number: KALA-C-069

2. Project Title: Restore Tombstones of Kalaupapa

3. Servicewide Issue: C13 - Need for Rehabilitation or Restoration of Historic and Prehistoric Structures

4. Problem Statement: Throughout the history of the Hansen's Disease settlements, there have been over 5,000 people buried on the peninsula. Most of these grave markers were wooden and no longer exist. There are, however, numerous monuments made of lava rock, cement, marble and granite. Kalaupapa cemeteries are tangible memorials to the people of the settlement. Most of the markers are made of cement, which has deteriorated badly and needs to be repaired. Many of the tombstones of Kalaupapa are unusual, perhaps even unique, because of their design and construction. They contribute to Kalaupapa's value as a National Historical Landmark.

5. Description of the Recommended Project: Restore the tombstones of Kalaupapa. Invite a restoration specialist here to develop a priority list for restoration and then to begin restoring headstones based on the list. The restoration specialist will also make recommendations for maintenance of the cemeteries (i.e. removal of trees and roots and control of alien plants).

6. Alternative Action/Solution and their Probable Impact: No action will result in the continual deterioration of certain tombstones. They will become unreadable.

7. Compliance: None needed.

8. Funding Requirements:

| | Year 1 |
|---|---|
| Personnel (Restoration Specialist GS-9 0.4 FTE) | $11,200 |
| Supplies | 2,000 |
| Other (Travel & Per Diem) | 2,500 |
| Total | $15,700 |

## APPENDICES

A. List of Consultants
B. Cultural Resources Documentation Checklist
C. Park Cultural Resources Status Summary Sheets
D. Annual Project Status and Accomplishments Report
E. Partial Listing of Archeological and Related Project Reports
F. Priority and Treatment Recommendations List
G. Derivation of Priority Listing for Stabilization and Maintenance of Historic Structures

Appendix A

## LIST OF CONSULTANTS

The following people have given their time and knowledge to make this report comprehensive. Any mistakes are the fault of the author, not the consultants. "Mahalo" to those listed below.

Steve Anderson, Natural Resources Specialist, Haleakala National Park
Marie Berueggman, USFWS, Honolulu
Neal Borgmeyer, Facilities Manager, Kalaupapa National Historical Park
Anne Brasher, Researcher, Waikolu and Pelekunu Streams
Marc Burt, Law Enforcement Ranger, Lake Mead National Recreation Area
Sheila Conant, University of Hawaii
Bill Evanson, DLNR, Natural Area Reserves Program
Melia Lane-Hamasaki, Cartographer, NPS Pacific Area Office
Paul Higashino, The Nature Conservancy-Maui
Rob Hommon, Archeologist, NPS Pacific Area Office
Jeff Hughes, Hydrologist, NPS Water Resources Division
Jim Jacobi, USFWS, Hawaii Volcanoes National Park
Jan Kaswick, Cultural Resources Specialist, Hawaii Volcanoes National Park
Andy Kikuta, USFWS, Hawaii
Lloyd Loope, Research Scientist, Haleakala National Park
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Peter Thompson, Superintendent, Kalaupapa National Historical Park
Don Tiernan, Natural Resources Specialist, NPS Pacific Area Office
Tim Tunnison, Natural Resources Specialist, Hawaii Volcanoes National Park
Ron Walker, DLNR, Division of Forestry and Wildlife
Lucy Whiting, Administrative Assistant, Kalaupapa National Historical Park

**Cultural Resources Documentation Checklist**

**Park Cultural Resource Status Summary Sheets**

Appendix D

**Annual Project Status and Accomplishments Report**

## FY93 ACCOMPLISHMENTS - KALAUPAPA NHP

N12 KALA - Determine Status of Biological Life in Waikolu Stream (N16): The field research on this project began in November of 1992. During the year, the researcher has been collecting data on the distribution and abundance of certain aquatic species. The research will continue for another six months with a final report following shortly thereafter. The research is providing important baseline information on the aquatic species. This information will be used to monitor and assess subsequent changes in aquatic populations.

N13 KALA - Inventory Water Rights, Uses and Requirements for Waikolu Stream (N19): The park has been working with the NPS Water Resources Division in Fort Collins, CO to complete an inventory of water rights, uses and requirements. Future consumptive and non-consumptive water requirements are being quantified using existing archive information.

C08 KALA - Conduct Archival Research for Pre-1866 Kalaupapa (C21): The park archeologist has been collecting information at the State of Hawaii Archives and the Bishop Museum. More research is needed before a final report can be completed.

C02 KALA - Conduct Aerial Archeological Survey of Kalaupapa (C32): Aerial photos were taken of the park. Currently, archeological features are being identified, located and plotted onto orthophoto and topographic quads. Field work to check and record features identified on the photographs and to prepare detailed maps of those sites that warrant further work still needs to be completed as does the final report.

**Partial Listing of Archeological and Related Project Reports**

**Priority and Treatment Recommendations List**

**Derivation of Priority Listing for Stabilization and Maintenance of Historic Structures**

**Figures**

Map of Special Ecological Areas (SEAs)